Trends in Precipitation Chemistry in the United States, 1983–94—An Analysis of the Effects in 1995 of Phase I of the Clean Air Act Amendments of 1990, Title IV

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TABLE OF CONTENTS

LIST OF TABLES

APPENDIX

Table Page

LIST OF FIGURES

Figure Page

APPENDIX

Figure Page

INTRODUCTION

Title IV of the Clean Air Act Amendments of 1990 (CAAA-90) (Public Law 101-549) seeks to reduce acidic deposition in the United States through phased reductions in sulfur dioxide and nitrogen oxide emissions. One of the first steps in assessing the effectiveness of emissions reductions is to evaluate spatial and temporal trends in sulfate (SO_4^{2-}), nitrate (NO_3^-), and hydrogen (H^+) ion concentrations in precipitation. Lynch et al. (1995a) reported the most recent comprehensive summary of temporal trends in precipitation chemistry in the United States using data from 58 National Atmospheric Deposition Program/National Trends Network (NADP/NTN) sites from 1980 through 1992. Results showed widespread declines in SO_4^{2-} concentrations accompanied by significant decreases in all of the base cations, most noticeably calcium (Ca^{2+}) and magnesium (Mg^{2+}). As a result, only 17 of the 42 sites with significant ($p<0.05$) decreasing SO_4^{2-} trends had concurrent significant decreasing H^+ trends. Lynch et al. (1995a) cautioned that they found considerable inter- and intra-regional variability in pH trends even among multiple sites within the same state. They speculated that significant site-specific changes in NO_3^- and ammonium (NH_4^+) concentrations, as well as varying magnitudes of SO_4^{2-} and Ca^{2+} changes could help explain much of this variability.

In the National Acid Precipitation Assessment Program (NAPAP) report on deposition monitoring, Sisterson et al. (1990) applied a Kendall seasonal tau test for trend detection in the presence of seasonal cycles (see Hirsch et al., 1982). Seasonal observations were defined as monthly mean precipitation-weighted concentrations or monthly depositions for each site. Data from six North American networks, including NADP/NTN, were used in the analysis. Sen's median slopes (see Hirsch et al., 1982) were calculated to estimate the magnitude of changes in concentrations and depositions for sites meeting predetermined data completeness criteria (Olsen et al., 1990; Sisterson et al., 1990). The NAPAP trends analysis addressed two time periods: a 39-site (24 NADP/NTN sites), 9-year data set (1979-1987) and a 148-site (76 NADP/NTN sites), 6-year data set (1982-1987). Statistically significant ($p<0.05$) trends were found at a higher proportion of sites for all ions, except NO_3^-, in the 9-year data set than during the 6-year period, suggesting that the largest changes occurred early in the data record from 1979-1982. Except for NO_3^- and potassium (K^+), the absolute magnitudes of the median percent changes were larger for the 9-year period, as well. For the ions that most affected pH (SO_4^{2-}, NO_3^-, NH_4^+, and Ca^{2+}), the strongest evidence for change was in the base cation, Ca^{2+}. Calcium decreased at 38 of the 39 sites over the 1979-1987 period; at 13 sites these changes, all down, were significant ($p<0.05$). Sulfate decreased at 35 of the 39 sites; at seven sites these changes, all down, were significant ($p<0.05$). Nitrate, NH_4^+, and H^+ ions exhibited a more even split of increasing and decreasing changes (Sisterson et al., 1990, pages 6-154 through 6-163). These results led the authors to conclude that the acidity of precipitation did not decrease because of the concurrent decrease in cation concentrations.

Lynch et al. (1995b) also evaluated trends in precipitation chemistry at NADP/NTN sites for multiple summary periods. This analysis utilized a general, linear least-squares model to evaluate trends for three summary periods: 1980-1993, 1983-1993, and 1985-1993. Major growth in the NADP/NTN occurred between 1980 and 1985 effectively tripling the number of network sites. Choosing successively later start dates allowed comparison of results among larger numbers of sites having greater spatial coverage. It also allowed the assessment of the effect of summary period length on trends. Regardless of the summary period length, the vast majority of NADP/NTN sites exhibited decreasing SO_4^{2-} concentrations. Consistent with

the findings of Sisterson et al. (1990), this analysis also indicated that SO_4^{2-} concentrations decreased more rapidly during the early 1980s and less rapidly thereafter. Nitrate and NH_4^+ concentrations exhibited considerable variability with only a few sites showing statistically significant trends, some positive and some negative. The larger SO_4^{2-} decreases in the early 1980s were similar to sulfur dioxide emissions changes, which decreased more rapidly between 1980 and 1983, then vacillated about a nearly constant rate in many states (Lins, 1987).

Hedin et al. (1994) reported steep declines in base cations in precipitation from Sweden, the Netherlands, and the United States. In the United States, annual volume-weighted mean concentrations of SO_4^{2-} and base cations (defined as the sum of non-sea-salt Ca^{2+}, Mg^{2+}, Na^+, and K^+) were calculated using data from 32 NADP/NTN sites (1979 or 1980 to 1990), nine Multistate Atmospheric Power Production Pollution Study (MAP3S) sites (1978-1988), and the Hubbard Brook Experimental Forest (HBEF) (1965-1989). A regression of these annual means against time in years yielded trend estimates for SO_4^{2-} and cations (NH_4^+, Ca^{2+}, Mg^{2+}, Na^+, K^+). At the HBEF and at NADP/NTN sites in the Northeast, Southeast, and Midwest, both SO_4^{2-} and base cations decreased and the trends were significant ($p<0.05$ or $p<0.001$). At the nine MAP3S sites, SO_4^{2-} decreases were also statistically significant; however, base cations decreased at only five sites, none of which were statistically significant. Hedin et al. (1994) concluded that recent declines in both base cation and SO_4^{2-} concentrations had offset one another in varying proportions in many regions in the Northern Hemisphere.

Other authors have also focused their attention on describing trends in precipitation concentrations or depositions (for eastern North America, see Sirois, 1993 or Oehlert, 1993; for NADP/NTN data, see Baier and Cohn, 1993; for MAP3S data, see Dana and Easter, 1987; for data from the Netherlands, see Ruijgrok and Romer, 1993 or Buishand et al., 1988; for data from Texas, see Kessler et al., 1992; and for data from New York, see Hirsch and Peters, 1988). All have shown general decreasing trends in SO_4^{2-} and base cation concentrations, with small and generally statistically insignificant changes in free acidity. In these studies, both parametric (e.g., Buishand et al., 1988) and nonparametric (e.g., Baier and Cohn, 1993) approaches have been used.

Measuring and reliably quantifying trends in precipitation chemistry are essential tools for assessing the effectiveness of sulfur and nitrogen emissions reductions programs designed to protect the environment. Trend estimation techniques were compared at a recent workshop (Holland et al., 1995). Four approaches were examined, including the linear least-squares model used in this analysis and several modifications of the seasonal Kendall test (Hirsch et al., 1982). In one case, a modification of Sen's slope estimator (Hirsch et al., 1982) was used to estimate the annual percentage change in precipitation-weighted mean concentrations. This comparison indicated that all four approaches were valid and generally yielded similar long-term trend results, although strengths and weaknesses were noted for each approach. The linear least-squares approach provided the added advantage of quantifying seasonal changes in concentration over time.

Phase I of Title IV of the CAAA-90 requires specific reductions in sulfur dioxide emissions on or before 1 January 1995 at selected electric utility plants, the majority of which are located in states east of the Mississippi River. As a result of this legislation, large reductions in sulfur dioxide emissions are likely to have occurred in 1995 which should have affected

SO_4^{2-} and H^+ concentrations, and to a lesser extent NO_3^- concentrations, in precipitation in this region. The purpose of this study was to evaluate this effect, if any, at NADP/NTN sites in the region in 1995. This assessment was based on a comparison of observed 1995 SO_4^{2-}, H^+, and NO_3^- concentrations at these NADP/NTN sites with estimates obtained from linear least-squares trend models of precipitation chemistry data collected from 1983 through 1994. The 1983 through 1994 summary period was selected for the following reasons: (1) the 1980-1994 record limits the number of sites to 57, too few for meaningful inter- and intra-regional comparisons; (2) the 1985-1994 summary period increases the number of sites to 168, but reduces the strength of the trend models estimates because of the shortness (10 years) of record; (3) the 1983-1994 summary period represents the best compromise between both the spatial and temporal strengths of the analysis; (4) the 1983-1994 summary period avoids potential start-up problems associated with field sampling and laboratory protocols; (5) the 1983-1994 period has stable emissions relative to the early 1980s (Lins, 1987); and (6) the National Trends Network (NTN) became a formal part of NADP in 1983, so many of the sites added in the 1983-1994 summary period over the 1980-1994 period were NTN sites.

METHODS AND RESULTS

Correction of Pre-1994 NADP/NTN Data

Since its inception in 1978, NADP/NTN sampling protocols required site operators to send precipitation samples to the Central Analytical Lab (CAL) at the Illinois State Water Survey in the ~14-liter HDPE (high density polyethylene) buckets used for collection. The bucket lid contained a rubber o-ring, which sealed the lid and bucket, preventing leaks during shipment. This o-ring was found to be a source of many of the same cations and anions measured in precipitation. For most samples, the concentration biases due to o-ring contamination were small and unimportant. Most affected were free H^+ concentrations (pH) at sites in the western states, where pH values are typically above 4.8. Samples lost free acidity due to the o-ring so sample pHs were biased high. Efforts to improve lid cleaning procedures reduced, but could not eliminate, o-ring contamination.

Although o-ring contamination was persistent, occasional changes by the lid manufacturer added to the uncertainty in the size of the bias over time. This had the potential for interfering with long-term trend analyses. Studies had shown that samples sent to the CAL in bottles had much smaller losses of acidity than samples sent in the buckets with the lid o-ring. As a result, the NADP/NTN elected to change its procedures effective 11 January 1994, ending the use of the buckets for sample shipment and eliminating any contact of the sample with the o-ring. After 11 January 1994, a snap-on lid with no o-ring was used to cover the collection bucket during transport from the site to the field laboratory and a one-liter, wide-mouthed, HDPE bottle was used for shipment to the CAL.

A special study was conducted at 11 sites scattered across the network to assess the size and direction of the concentration change of each analyte due to lid o-ring contamination. The results of this study were analyzed with the intent of identifying a set of algorithms that could be used to adjust the pre-1994 data for the effects of o-ring contamination. Side-by-side samples were collected at these sites, one using the old procedure with the bucket and lid

with the o-ring and the other using the new procedure with the bottle. Paired concentration differences were calculated from the two samples at each site. Nonlinear, least squares regressions were performed to evaluate these differences for dependence on sample volume or on pH or on a combination of these factors. CAL experimental results suggested that both factors could be important in explaining the differences between the bucket and bottle samples. Specifically, these results indicated that as the volume increases the o-ring contamination increases, approaching a maximum value. For a fixed volume, the o-ring contamination is large at low and high pH values and small at mid-level pHs. These volume and pH relationships dictated the form of the equations used in the analysis.

Six different models (algorithms) per analyte were evaluated for each of the conservative ions. These included: (1) a constant mass model, (2) a simple linear regression model, (3) a mass difference model as a function of sample volume, (4) a mass difference model as a function of sample volume and pH, (5) a power law model, and (6) hybrids of 2 and 3 or 2 and 4. To select the best algorithms, the root mean square (RMS) bucket/bottle concentration differences and the RMS corrected bucket/bottle concentration differences from the six models were calculated. A sensitivity test of the RMS calculations was performed using a "bootstrap" experiment with 100 repetitions. Following these experiments, the most robust algorithms with the lowest RMS of the corrected bucket/bottle concentration differences were identified. Using the overall "best fit" models for the conservative ions, the pH (H^+) correction was evaluated. This evaluation revealed that the best model was one based on adding the effects of all of the corrections plus an unmeasured cation (probably zinc, which can be leached from the lid seal), then calculating a corrected pH. The equations that best fit the special study results for all measurements are presented in the Appendix (Table A.1). Four of the correction equations (K^+, NO_3^-, Na^+, and SO_4^{2-}) incorporate both sample volume and sample pH as predictor variables. For four others (Ca^{2+}, Mg^{2+}, NH_4^+, and Cl^-), sample volume alone was the best predictor.

A comparison of volume-weighted mean annual concentrations in precipitation for corrected and uncorrected NADP/NTN data from 1983-1993 (Appendix, Table A.2) illustrates the effects the corrections (Appendix, Table A.1) had on NADP/NTN precipitation chemistry data. At all sites, the corrections resulted in lower mean annual concentrations for all ions, except H^+. Hydrogen ion concentrations increased as reflected in the lower pH values. With a few exceptions, the reductions in pH were less than 0.04 unit in the eastern states; reductions in pH were higher in the West, with some sites experiencing reductions in mean annual pH of more than 0.3 unit. Sulfate concentrations generally decreased from 0.03 mg/L to 0.04 mg/L in the western region of the country; at Eastern sites, SO_4^{2-} concentration decreases were about 0.01 mg/L with concentration changes at some sites exceeding 0.1 mg/L. Decreases in NO_3^- concentrations were fairly uniform across the country and averaged around 0.03 mg/L. Chloride concentrations decreased approximately 0.005 mg/L and did not exhibit significant regional differences. Ammonium concentrations decreased approximately 0.01 mg/L and were considerably more variable in the western than the eastern states. Calcium and Mg^{2+} concentrations decreased between 0.003 and 0.004 mg/L at most sites and exhibited very little spatial variation across the country. A similar pattern and magnitude of change was also evident for K^+ and Na^+ concentrations. Overall, the correction equations did not result in any major aberrations in the data set and are consistent with results from bucket versus bottle comparison studies.

Temporal Trend Analyses

Temporal trend analyses covered the entire NADP/NTN network, included all analytes except orthophosphate, and was based on corrected data through 1993 and 1994 data. Trends in analyte concentrations were examined for the 1983-1994 summary period. Results of this analysis provided a baseline against which 1995 concentrations were contrasted to assess the effects of the CAAA-90, Phase I emissions reductions on precipitation chemistry.

In the trend analysis of the summary period (1983-1994), weekly precipitation volume and corrected chemical observations were accumulated into bi-monthly precipitation totals and volume-weighted mean concentrations of H^+ (from pH), SO_4^{2-}, NO_3^-, Cl^-, NH_4^+, Ca^{2+}, Mg^{2+}, K^+, and Na^+ ions. Orthophosphate was omitted because a large percentage (>80%) of weekly samples have concentrations below the analytical detection limit (0.003 mg/L). Only valid weekly samples with a complete set of analyses were used to calculate bi-monthly volume-weighted mean concentrations. Sites and bi-monthly records were selected for the trend analysis according to the following completeness criteria:

(1) Only those monitoring sites having weekly precipitation chemistry records from January 1983 through December 1994, were considered. At least 75 percent of the precipitation recorded during this summary period had to have valid chemical analyses in order for the site's data to be accepted for trend analyses.

(2) For a bi-monthly record to be accepted, a valid analysis for each ion had to be available for at least 75 percent of the bi-monthly precipitation.

(3) During each bi-monthly period, at least 50 percent of the weekly samples having sufficient volume for analysis (≥35 mL) had to have a valid analysis for each ion.

Trends in ionic concentrations in precipitation at each site were evaluated using a two-stage, least-squares general linear model (SAS Inst, 1988). This model was developed by the principal investigators for detecting and quantifying trends in precipitation chemistry data that exhibit strong seasonal patterns (Lynch, et al., 1995a). The form of the model for both stages was

$$\log(C_y) = b_0 + b_y{}^{*}y + \sum_{s=1}^{6} b_s I_s$$

where,
- C_y = estimated concentration of a given ion at time y.
- b_0 = intercept.
- b_y = slope of the long-term log-concentration trend.
- y = mid-point of the bi-monthly observation period expressed as decimal years. For example, y for a May-June 1990 observation was coded as 90+(5/12) or 90.4167.
- b_s = adjustment to estimate for bimonthly period, s. The array of 6 b_s coefficients account for the seasonal variation in precipitation chemistry.
- I_s = an element of an array of 6 indicator variables set to 1 for bi-monthly period, s, and set to 0, otherwise.

Log-transformed concentrations were used because the model residuals have a more nearly normal distribution (Lynch et al., 1995a). After initially fitting the model to a site's concentration data (expressed as μeq/L) for a given ion, studentized residuals were calculated. Bi-monthly observations having a studentized residual >3.5 in absolute value were eliminated from the data set and a second calculation of model coefficients was performed using the remaining observations. The selected cut-off value applied to the studentized residuals would be exceeded by chance at a rate less than 0.001 under the assumption of normally distributed residuals of constant variance.

A tabular summary of the trend results is presented in Table A.3 (Appendix). This summary table contains information on the direction (b_{year}) and statistical significance (p) of the trend in each analyte for each site that met the above completeness criteria. Sites are identified by their NADP/NTN CAL code. The Mississippi River was used to segregate those sites located in the eastern and western sections of the country. The number of sites exhibiting increasing trends and the number exhibiting decreasing trends are presented in Table 1. These sites are further subdivided by statistical significance ($p<0.05$).

The direction and statistical significance ($p<0.05$) of trends for each analyte are also presented graphically in Figures 1-9. Upward or downward pointing triangles indicate the direction of the trend. A solid triangle indicates a statistically significant ($p<0.05$) trend; an open triangle indicates that the trend is not significant ($p>0.05$). NADP/NTN sites located in Alaska and Hawaii are not shown on the maps but were included in the analyses if they met the completeness criteria.

Changes in ionic composition of precipitation at each site from the beginning (1983) to the end (1994) of the summary period were calculated as the difference between the average of six bi-monthly mean concentrations (μeq/L) estimated from the models for 1983 and 1994. Cation and anion concentration (μeq/L) changes and percent changes from 1983 to 1994 are presented in Table 4.A (Appendix). Table 2 lists the mean concentration (μeq/L) changes and percent changes for all sites and for only sites with statistically significant ($p<0.05$) trends. The coincidence of significant ($p<0.05$) decreasing SO_4^{2-} and H^+ concentrations is summarized in Table 3. Sites are identified by the NADP/NTN CAL code.

Evaluating the Effectiveness of Phase I of the Clean Air Act Amendments of 1990

Phase I of the CAAA-90, Title IV was implemented on 1 January 1995. One-hundred and ten (110) electric utility plants were affected in 21 states, 17 of which are located east of the Mississippi River. Sixty-three (63) of these targeted plants are located in states in the Ohio River Valley. Notwithstanding the effects of trades of emissions allowances, large reductions in sulfur dioxide emissions are likely to have occurred in 1995, particularly in the eastern states. These reductions should have affected precipitation chemistry, particularly SO_4^{2-} and H^+ concentrations, and to a lesser extent NO_3^- concentrations. In order to evaluate this effect, if any, at NADP/NTN sites in the eastern states in 1995, the linear least-squares models discussed above were used to estimate 1995 bi-monthly and annual mean concentrations for each analyte. The model estimates were compared to actual bi-monthly volume-weighted mean concentrations for each NADP/NTN site that met the above completeness criteria. Because the bi-monthly means were summed to obtain annual means, only 109 sites with six valid 1995 bi-monthly means were included in this analysis. For

comparative purposes, separate, identical analyses were conducted for sites located east and west of the Mississippi River. The impact of Phase I emissions reductions in the western states should have been minimal given that only 16 of the affected plants are located in this region (Missouri-8, Iowa-6, Kansas-1, Minnesota-1). As a result, a comparison of predicted with observed concentration means in both regions provides a means of evaluating model performance and the effect of CAAA-90 emissions reductions on precipitation chemistry.

The results of the comparisons of 1995 measured and estimated bi-monthly and annual mean concentrations for individual sites located in eastern and western regions of the country are presented in Tables 4, 5, and 6 for SO_4^{2-}, H^+, and NO_3^- concentrations, respectively. Similar comparisons for the remaining cations and anions are presented in the Appendix (Tables A.5-A.10). Eastern results are further stratified into Northeast (NE) and Southeast (SE) regions. Table 7 list the frequency of occurrence of observed 1995 cation and anion concentrations that were less than predicted concentrations. Regional mean and percent departures from the trend model estimates are presented in Table 8 for annual and bi-monthly cation and anion concentrations.

One way to assess the statistical significance of the effects of Phase I emissions reductions on precipitation chemistry is to determine the significance of the deviations of the 1995 bi-monthly observations from the trend model estimates derived from the 1983-1994 data. Because only one year (1995) of data is available subsequent to Phase I implementation, quantifying a slope change in the long-term trend is inappropriate. However, the data do permit estimation of changes in the intercept of the trend line coinciding with the implementation of emission reductions. Estimating the change in the intercept is appropriate because it directly quantifies the "step-function" that would occur in precipitation chemistry if emissions were reduced suddenly, i.e., large reductions over a short period of time. The change in intercept for the 1995 data was estimated by adding a binary indicator variable to the seasonal trend models. This indicator variable was given a value of 1 for 1995 observations and a value of 0, otherwise. This variable's estimated coefficients and its significance are presented in Table A.11 (Appendix) which indicates in what direction and at which sites the 1995 data departed from the historical trend. Because there are only six bi-monthly observations in 1995, the power of this statistical test for change is rather low. Nevertheless, the results of this analysis reaffirm the results from the linear least-squares models and illustrate that the 1995 precipitation chemistry data were different from the historical trends at NADP/NTN sites located in the Eastern United States. Sulfate and H^+ concentrations in 1995 at 12 of the 62 sites located east of the Mississippi River were significantly ($p<0.05$) different when compared to the historical trend models at these sites; for NO_3^- concentrations, only two sites were significantly different, both positive indicating higher concentrations in 1995 than the model estimates.

In addition to the above analyses, 1983-1994 trends for selected sites are presented graphically by plotting observed bi-monthly mean concentrations along with two corresponding estimates of concentration against time. One set of estimates was from the least-squares general linear models described above, the other set was from a LOWESS regression of the observed bi-monthly mean concentrations. The LOWESS smoothing method, described by Cleveland (1979 and 1985), was added because it does not assume a functional relationship between concentration and time and can depict nonlinearities in trends. The LOWESS method was not used to statistically assess concentration trends

because assessment of changes in ionic concentration from one time to another, by definition, involves linear hypotheses and because LOWESS regressions do not provide an overall test of trend or model fit for the data set as a whole. The "moving window" of data points was set at 2 years (12 bi-monthly points) before and after the date to be estimated. The distance weighting function for the LOWESS regressions was,

$$d_i = (1-p_i^3)^3$$

where,

$p_i = |x_i-x_t|/W$ for $|x_i-x_t| < W$; otherwise, 1
x_t = date of point to be estimated in decimal years
x_i = date of i^{th} sample point in decimal years
W = width of moving window in each direction (i.e., 2.0 years)

The robustness weights for the second stage of the LOWESS estimation procedure were calculated as,

$$w_i = (1-p_i^2)^2$$

where,

$p_i = (|r_i|/R)$ for $|r_i| < R$; otherwise, 1.0
r_i = studentized residual of i^{th} sample point from the first stage LOWESS regression
R = Maximum absolute value of studentized residual for sample points to be used in the second stage regression. R was set to 4.

For comparison purposes, a disjunct LOWESS regression line was plotted for the six bi-monthly mean concentrations in 1995. This LOWESS regression was based on 1993-1995 bi-monthly mean observations. It was separated physically from the 1983 through 1994 LOWESS line to emphasize the step-function change in 1995 from the preceding 12-year summary. Six examples of H^+, SO_4^{2-}, and NO_3^- concentration trends showing the linear model (solid line) and LOWESS regression (dashed line) and the observed bi-monthly mean concentrations (solid circles) are presented in Figures 10-15 for the 1983-94 and 1995 summary periods. Figures 10 and 11 (KY03 and IL63, respectively) illustrate a dramatic change in 1995 bi-monthly mean concentrations relative to the historical trend, while Figures 12 (NC36) and 13 (VT01) illustrate a moderate decrease and Figures 14 (IN34) and 15 (MA08) illustrate no change. The remaining cation and anion comparisons for these six sites appear in the Appendix (Figures A.1-A.12).

Color-scaled raster maps based on surface estimation algorithms are frequently used to display precipitation chemistry data over a region. This approach was used to illustrate the departures of 1995 observed concentrations (μeq/L and percent) from the trend model estimates for 1995. Maps were prepared for the eastern half of the country, where the greatest impact of Phase I emissions reductions was most likely to occur. The differences were plotted using the Multiquadic Equations (MQE) surfacing function described by Hardy (1971) and evaluated as a tool for depicting regional wet deposition by Grimm and Lynch (1991). Also included is a color-scaled raster map showing deviations in 1995 precipitation volumes from the 1983 through 1994 annual average volumes. All four maps are based on

data from the 109 sites included in the analysis of the effectiveness of the CAAA-90 discussed above. Results are presented in Figures 16, 18, 20, and 22 for SO_4^{2-}, H^+, NO_3^-, and precipitation volume, respectively; percent differences are presented in Figures 17, 19, 21, and 23, respectively. The location of NADP/NTN sites are indicated by a plus (+) sign.

DISCUSSION

Temporal Trends, 1983-94: Magnitude, Direction and Significance

Sulfate concentrations at 92% of the NADP/NTN monitoring sites in the United States have decreased since 1983; the trends are statistically significant ($p<0.05$) at 38% of the sites (Table 1, Figure 1). No major regional (east vs west) differences in the number and percentage of sites exhibiting decreasing SO_4^{2-} trends are evident. Sites with increasing SO_4^{2-} trends (Table 1) are also uniformly distributed across the country; however, only one of the increasing SO_4^{2-} concentration trends is significant ($p<0.05$). The mean change in SO_4^{2-} concentrations across the United States from 1983 to 1994 was -4.80 μeq/L (16.4%) compared to -7.69 μeq/L (25.9%) at sites with statistically significant trends (Table 2). Sulfate concentrations have decreased more rapidly in the eastern states (5.94 μeq/L vs 3.71 μeq/L), although the mean percentage change has been greater in the western states (18.9% vs 13.8%). This pattern is also evident at sites with significant ($p<0.05$) trends; however, the concentration and percentage decreases are much larger (Table 2).

Nitrate concentration trends do not exhibit a consistent spatial pattern (Figure 2). The number of sites exhibiting increasing trends is nearly equal to the number exhibiting decreasing trends (Table 1). Perhaps of greater importance, a larger percentage of sites with increasing trends (14%) are significant ($p<0.05$), while only two of the 153 sites included in this analysis have significant decreasing trends. A larger percentage of sites with increasing trends are located in the western states. As expected from these results, the network mean change in NO_3^- concentrations was very small (<0.5 μeq/L) and positive (Table 2). However, the mean NO_3^- concentration at the 23 sites with statistically significant trends (2 decreasing, 21 increasing) increased 51.6% (3.34 μeq/L). The largest increases in NO_3^- concentrations occurred in the western states.

Ammonium concentrations increases were larger and more widespread than NO_3^- increases (Table 2, Figure 3). Eighty percent (80%) of the sites in the NADP/NTN exhibited increasing NH_4^+ concentrations since 1983 (Table 1); at 22% of the sites the trends are significant ($p<0.05$). Only one of the sites has a statistically significant decreasing trend. Although regional patterns are similar, the largest number of sites with significantly increasing trends are located in the western states. The average increase in NH_4^+ concentrations at these sites is 6.40 μeq/L, an increase of 86.6% over 1983 levels. The network-wide increase in NH_4^+ concentrations since 1983 is 2.33 μeq/L (28.2%). Clearly, nitrogen concentrations (both NO_3^- and NH_4^+) in precipitation have increased in the United States since 1983.

Calcium (Figure 4), Mg^{2+} (Figure 5), and K^+ (Figure 6) concentrations decreased markedly in the United States since 1983. Very few sites exhibited increasing concentrations (Table 1): Ca^{2+} (9 sites), Mg^{2+} (2 sites), and K^+ (21 sites); only two of these trends (both K^+) are

significant ($p<0.05$). Decreasing trends are significant at 52% of the sites for Ca^{2+}, 77% for Mg^{2+}, and 38% for K^+. A higher percentage of these sites is located in the eastern states. Mean percentage decreases in these cations are fairly consistent across the United States, 23.5% for K^+, 27.9% for Ca^{2+} and 39.7% for Mg^{2+} (Table 2). Despite regional similarities in percent decreases, the concentration (μeq/L) changes have been consistently larger in the western portion of the country for all three cations. These same patterns are evident when only sites with significant trends are compared, although the percent and μeq/L changes are larger. Clearly, base cation concentrations have decreased over the past 12 years. Similar results have been reported by Lynch et al., (1995a, 1995b); Hedin et al., (1994); and Sisterson et al., (1990).

Sodium and Cl^- concentrations generally decreased across the country (Figures 7 and 8); trends are significant ($p<0.05$) at 20% of the sites for Na^+ and 37% for Cl^- (Table 1). Regional differences in both Na^+ and Cl^- trends are evident, with slightly more significant Cl^- and Na^+ trends in the western than eastern region of the country. Across the United States, Na^+ and Cl^- concentrations decreased approximately 20% on average since 1983 (Table 2). At sites with significant trends, Na^+ and Cl^- concentrations are 36.8% to 32.3% lower. On a concentration basis, both Na^+ and Cl^- decreased 1.5 μeq/L since 1983.

Like SO_4^{2-} concentrations, the majority of sites (81%) exhibited decreases in H^+ concentrations from 1983 through 1994 (Table 1, Figure 9). However, only 39 sites (25%) have statistically significant H^+ decreases, 20 in the western states and 19 in the eastern states. Of the 29 sites exhibiting H^+ increases, only one is significant. Free acidity in precipitation across the United States decreased by 2.68 μeq/L (13.4%) on average since 1983, with the largest concentration (smallest percentage) changes occurring in the East (Table 2). This same pattern is evident when only sites with significant trends are compared, although both the percentage and concentration decreases are more than twice as large. The lack of consistency between sites with both significant decreasing SO_4^{2-} and H^+ concentrations (Table 3) suggests that concurrent changes in other ions have offset varying amounts of the SO_4^{2-} decrease. As a result, commensurate reductions in H^+ did not occur. A similar hypothesis has been suggested by Lynch et al., (1995a); Hedin et al., (1994); and Sisterson et al., (1990). The ions most frequently offsetting the SO_4^{2-} reductions are the acid neutralizing cations, Ca^{2+} and Mg^{2+}. However, at some sites, increasing NO_3^- concentrations have offset SO_4^{2-} reductions leaving small changes in free acidity (Lynch et al., 1995a).

Comparison of Predicted and Observed 1995 Concentrations

Sulfate and H^+ concentrations in the eastern states in 1995 were considerably lower than predicted from the trend models for the 1983-1994 reference summary period (Tables 4 and 5); NO_3^- concentrations remained relatively unchanged (Table 6). Two examples each of relatively large decreases (KY03 and IL63), moderately large decreases (NC36 and VT01), and little to no change (IN34 and MA08) in 1995 bi-monthly mean SO_4^{2-} and H^+ concentrations, compared to the 1983-1994 trend models, are shown in Figures 10-15, respectively. Site selection was based on change in SO_4^{2-} concentrations in 1995 relative to the historical trend at each site. A LOWESS regression line (dashed line) is included to illustrate the step-function change in SO_4^{2-} and H^+ concentrations that occurred in 1995. Corresponding base cation and Cl^- concentrations at these sites are shown in Figures A.1-A.12 in the Appendix.

Mean annual H^+ and SO_4^{2-} concentrations in 1995 were below predicted values at 88.7% and 79.0%, respectively, of the 109 sites that met the data completeness criteria (Table 7). By comparison, only 31.9% and 36.2%, respectively, of the Western sites were below modeled estimates. On average, 1995 measured SO_4^{2-} concentrations in the eastern states were 4.01 μeq/L (9.8%) below modeled estimates (Table 8). The SO_4^{2-} decreases were substantially larger than 4 μeq/L in much of the Northeast. In contrast, at sites west of the Mississippi River 1995 SO_4^{2-} concentrations averaged 1.37 μeq/L (7.5%) higher than the modeled estimates (Table 8). The spatial pattern of H^+ decreases in the East was virtually the same as the pattern of SO_4 decreases, although the magnitude of the concentration and percentage decreases were even larger than SO_4^{2-} decreases (Table 8).

Unlike SO_4^{2-} and H^+ concentrations, NO_3^- concentrations in 1995 were above predicted concentrations at the majority of sites located in both regions of the country (Table 7). Approximately 61% of the sites in the East recorded higher NO_3^- concentrations in 1995 than predicted from the 1983-1994 models; 57% of the western sites were above model predictions (Table 7). Nitrate concentrations in 1995 were 0.97 μeq/L (4.6%) and 0.76 μeq/L (3.8%) above modeled estimates in the eastern and western states, respectively (Table 8). In addition, there was no evidence of sharp drops in the Northeast as there was for SO_4^{2-}. These results suggest that nitrogen oxides emissions were not significantly affected by Phase I of the CAAA-90, Title IV in 1995, at least not on a broad regional basis.

Color-scaled raster maps of the changes in SO_4^{2-}, H^+, and NO_3^- concentrations are shown in Figures 16, 18, and 20, respectively; percent changes in these ions are presented in Figures 17, 19, and 21, respectively. The largest reductions in SO_4^{2-} and H^+ concentrations occurred along the Ohio River Valley and in states located immediately downwind of this region. Although no emissions data are presented in this analysis, this region was clearly targeted for major reductions in sulfur dioxide emissions by Phase I of the CAAA-90, Title IV. In fact, of the 110 plants affected by Title IV, 63 are located in this region. Downwind of the Ohio River Valley, e.g., New England or the southeastern states., decreases in both SO_4^{2-} and H^+ concentrations in 1995 were smaller. There are only six affected sources in New England and 18 in the Southeast that were targeted for reductions in emissions in Phase I of the CAAA-90, Title IV. Another important feature of these maps is that the SO_4^{2-} reductions in the eastern states are roughly matched in magnitude and location by H^+ reductions. The largest decreases occur in the Ohio River Valley and the northern portion of the Mid-Atlantic region.

To examine whether the sharp drop in SO_4^{2-} and H^+ concentrations in 1995 were due to precipitation anomalies, a comparison of bi-monthly and annual precipitation volumes at each site with their 1983-1994 means was undertaken. Results of this analysis are listed for each site in Table A.12 (Appendix). A summary of these results is presented in Figures 21 and 22, which depict departures of 1995 annual precipitation from the mean annual volume during 1983 through 1994. A comparison of the precipitation volume color-scaled map (Figure 21) with the SO_4^{2-} (Figure 16) and H^+ (Figure 18) concentration maps reveals that where 1995 SO_4^{2-} and H^+ concentrations were higher than trend model estimates (e.g., the southwestern portion of the Eastern United States and a region south and east of Lake Michigan), 1995 volumes were below the 1983-94 averages. Ionic concentrations in weekly NADP/NTN samples depend on precipitation volume (Baier and Cohn, 1993). Low precipitation volumes are associated with high concentrations and vice versa. When these factors are taken into consideration, the actual reductions in SO_4^{2-} and H^+ concentrations across much of Pennsylvania, Western New York, and the southern portion of New England in 1995 would have been greater had a more "average" amount of precipitation occurred in these regions.

A comparison of the differences in 1995 annual and bi-monthly mean concentrations for those cations (NH_4^+, Ca^{2+}, Mg^{2+}, K^+, and Na^+) and Cl^- that would not have been substantially affected by Phase I sulfur dioxide reductions (Tables A.5-A.10, Appendix), supports the argument that the changes in SO_4^{2-} and H^+ concentrations in 1995 were not the result of lower precipitation volume. Precipitation volumes would not selectively affect H^+ and SO_4^{2-} concentrations; all ionic concentrations would be affected. A review of the individual site data in Tables A.5-A.10 (Appendix) and observed differences in NO_3^- concentrations (Figure 20) and percent changes (Figure 21) support this statement. It is not apparent that NO_3^- concentrations were affected over the eastern states by Phase I emissions reductions, only that NO_3^- was affected by the below average precipitation volumes. For example, regions with higher than predicted 1995 NO_3^- concentrations had below average precipitation and regions with lower concentrations in 1995 generally had above average precipitation. Although nitrogen emissions may have been affected by the CAAA-90, Title IV, the reductions would have been much smaller than the sulfur dioxide reductions. In addition, since Phase I, Title IV of the CAAA-90 targeted only stationary (utilities) sources and since these sources contribute only one-third of the total United States nitrogen oxide emissions (Placet, 1990), it is highly unlikely that large regions of the East would experience major reductions in nitrate concentrations in 1995.

CONCLUSIONS

Clearly, implementation of Phase I of the CAAA-90, Title IV (Public Law 101-549), has resulted in lower sulfate concentrations in precipitation in the Eastern United States, particularly along the Ohio River Valley and in the Mid-Atlantic region. Concurrent with these sulfate reductions have been similar (nearly one for one) reductions in hydrogen ion concentrations. In contrast, nitrate concentrations, as well as chloride and base cations, were not affected. Although emissions data were not included in this analysis, maximum reductions in sulfate and hydrogen ion concentrations occurred in the same area as and immediately downwind of most of the major stationary sources targeted by Phase I of the CAAA-90, Title IV. Precipitation deviations from the long-term (1983-1994) average cannot explain the observed decreases in sulfate and hydrogen ion concentrations in 1995. For one, precipitation volumes would not selectively reduce only sulfate and hydrogen ions. Other ions would be similarly affected, but they were not. For another, lower precipitation volumes are associated with higher concentrations, and most of the eastern states had below average precipitation volumes in 1995. Indeed, the lower volumes resulted in higher 1995 concentrations for virtually all ions except sulfate and hydrogen. These two ions dropped independent of precipitation volume. These results clearly support the conclusion that Phase I of the CAAA-90, Title IV, has reduced acid deposition (acid rain) in the Eastern United States.

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Table 1. Frequency of NADP/NTN sites at which ionic concentrations of precipitation increased or decreased from 1983 through 1994.

Region	No. of sites	Number (percent) of sites with decreasing trends	Number (percent) of sites with significantly* decreasing trends	Number (percent) of sites with increasing trends	Number (percent) of sites with significantly* increasing trends
			Hydrogen Ion		
East	75	58 (77)	19 (25)	17 (23)	1 (1)
NE	55	45 (82)	19 (35)	10 (18)	0 (0)
SE	20	13 (65)	0 (0)	7 (35)	1 (5)
West	78	66 (85)	20 (26)	12 (15)	0 (0)
Total	153	124 (81)	39 (25)	29 (19)	1 (1)
			Sulfate		
East	75	69 (92)	28 (37)	6 (8)	0 (0)
NE	55	51 (93)	22 (40)	4 (7)	0 (0)
SE	20	18 (90)	6 (30)	2 (10)	0 (0)
West	78	71 (91)	30 (38)	7 (9)	1 (1)
Total	153	140 (92)	58 (38)	13 (8)	1 (1)
			Nitrate		
East	75	40 (53)	2 (3)	35 (47)	4 (5)
NE	55	30 (55)	2 (4)	25 (45)	2 (4)
SE	20	10 (50)	0 (0)	10 (50)	2 (10)
West	78	28 (36)	0 (0)	50 (64)	17 (22)
Total	153	68 (44)	2 (1)	85 (56)	21 (14)
			Chloride		
East	75	70 (93)	22 (29)	5 (7)	0 (0)
NE	55	52 (95)	20 (36)	3 (5)	0 (0)
SE	20	18 (90)	2 (10)	2 (10)	0 (0)
West	78	74 (95)	34 (44)	4 (5)	0 (0)
Total	153	144 (94)	56 (37)	9 (6)	0 (0)
			Ammonium		
East	75	19 (25)	1 (1)	56 (75)	8 (11)
NE	55	14 (25)	1 (2)	41 (75)	4 (7)
SE	20	5 (25)	0 (0)	15 (75)	4 (20)
West	78	12 (15)	0 (0)	66 (85)	26 (33)
Total	153	31 (20)	1 (1)	122 (80)	34 (22)
			Calcium		
East	75	73 (97)	47 (63)	2 (3)	0 (0)
NE	55	53 (96)	35 (64)	2 (4)	0 (0)
SE	20	20 (100)	12 (60)	0 (0)	0 (0)
West	78	71 (91)	33 (42)	7 (9)	0 (0)
Total	153	144 (94)	80 (52)	9 (6)	0 (0)
			Magnesium		
East	75	73 (97)	61 (81)	2 (3)	0 (0)
NE	55	55 (100)	48 (87)	0 (0)	0 (0)
SE	20	18 (90)	13 (65)	2 (10)	0 (0)
West	78	78 (100)	57 (73)	0 (0)	0 (0)
Total	153	151 (99)	118 (77)	2 (1)	0 (0)
			Potassium		
East	75	65 (87)	31 (41)	10 (13)	1 (1)
NE	55	49 (89)	26 (47)	6 (11)	0 (0)
SE	20	16 (80)	5 (25)	4 (20)	1 (5)
West	78	67 (86)	27 (35)	11 (14)	1 (1)
Total	153	132 (86)	58 (38)	21 (14)	2 (1)
			Sodium		
East	75	64 (85)	16 (21)	11 (15)	0 (0)
NE	55	49 (89)	13 (24)	6 (11)	0 (0)
SE	20	15 (75)	3 (15)	5 (25)	0 (0)
West	78	69 (88)	17 (22)	9 (12)	0 (0)
Total	153	133 (87)	33 (22)	20 (13)	0 (0)

*$p<0.05$

Table 2. Mean μeq/L and percent changes in ionic concentrations of precipitation collected at NADP/NTN sites from 1983 through 1994.

Region	Mean change in conc. for all sites (μeq/L)	Percent	Mean change in conc. for sites with significant* trends (μeq/L)	Percent
		Hydrogen Ion		
East	-3.69	-8.2	-8.56	-17.8
NE	-4.61	-10.1	-9.44	-20.3
SE	-1.15	-3.0	8.06	29.0
West	-1.71	-18.3	-3.93	-42.1
Total	-2.68	-13.4	-6.25	-29.9
		Sulfate		
East	-5.94	-13.8	-9.86	-22.8
NE	-6.57	-13.9	-10.43	-22.2
SE	-4.22	-13.4	-7.78	-24.7
West	-3.71	-18.9	-5.73	-28.7
Total	-4.80	-16.4	-7.69	-25.9
		Nitrate		
East	-0.29	1.0	1.74	15.5
NE	-0.51	-0.4	0.61	6.8
SE	0.34	5.1	4.02	32.8
West	1.00	17.6	3.91	64.4
Total	0.37	9.5	3.34	51.6
		Chloride		
East	-0.89	-16.3	-1.30	-27.3
NE	-0.83	-17.3	-1.25	-27.3
SE	-1.06	-13.5	-1.87	-26.9
West	-1.47	-24.3	-1.61	-35.6
Total	-1.18	-20.4	-1.49	-32.3
		Ammonium		
East	1.14	13.6	3.46	49.8
NE	1.14	11.4	3.71	37.4
SE	1.15	19.8	3.16	65.2
West	3.47	42.3	6.40	86.6
Total	2.33	28.2	5.65	77.1
		Calcium		
East	-1.85	-28.5	-2.33	-36.0
NE	-1.88	-26.0	-2.36	-32.8
SE	-1.77	-35.4	-2.27	-45.2
West	-2.57	-27.3	-3.46	-42.2
Total	-2.22	-27.9	-2.80	-38.6
		Magnesium		
East	-0.93	-37.5	-1.03	-42.7
NE	-0.97	-39.5	-1.04	-43.1
SE	-0.81	-31.9	-1.00	-41.3
West	-1.27	-41.8	-1.47	-48.8
Total	-1.10	-39.7	-1.24	-45.6
		Potassium		
East	-0.13	-21.3	-0.23	-37.2
NE	-0.14	-23.8	-0.24	-41.3
SE	-0.11	-14.5	-0.18	-19.3
West	-0.22	-25.5	-0.36	-42.1
Total	-0.18	-23.5	-0.29	-39.5
		Sodium		
East	-0.53	-14.3	-1.01	-29.4
NE	-0.52	-16.2	-0.90	-30.4
SE	-0.57	-9.2	-1.52	-25.2
West	-1.14	-20.7	-1.99	-43.7
Total	-0.84	-17.6	-1.52	-36.8

*$p<0.05$

Table 3. Coincidence of significantly ($p<0.05$) decreasing sulfate concentrations with significantly decreasing hydrogen ion concentrations from 1983 through 1994.

Region	Site	p(SO4)	p(H)
NE	wi28	0.0001	0.0013
	ny10	0.0001	0.0056
	wv04	0.0001	0.0067
	in20	0.0003	
	mi26	0.0004	0.0364
	wi37	0.0025	
	ny52	0.0031	0.0055
	mi99	0.0039	
	mi09	0.0040	0.0302
	ky22	0.0052	0.0422
	il19	0.0055	0.0163
	ny98	0.0075	0.0205
	mi98	0.0127	0.0057
	pa15	0.0146	0.0029
	wi99	0.0216	
	va28	0.0235	0.0491
	wi36	0.0283	
	il11	0.0318	0.0223
	in41	0.0366	0.0321
	il63	0.0367	
	mi53	0.0406	0.0211
	me98	0.0417	
	in34	0.0437	0.0013
	16 of 23 sites (70%)		
SE	ms10	0.0035	
	nc25	0.0083	
	tn00	0.0100	
	al10	0.0196	
	ms30	0.0251	
	nc03	0.0314	
	0 of 6 sites (0%)		
West	wy02	0.0001	0.0001
	or10	0.0001	
	mn16	0.0003	
	ca45	0.0005	0.0347
	co98	0.0005	
	mo03	0.0006	0.0068
	mt05	0.0006	
	az99	0.0007	0.0002
	ar27	0.0019	
	ca98	0.0025	
	nm07	0.0025	
	mn18	0.0035	
	co19	0.0036	
	nm09	0.0037	0.0104
	az03	0.0040	
	co22	0.0047	0.0154
	or02	0.0057	
	or97	0.0064	0.0066
	co99	0.0081	
	mn27	0.0084	
	ca88	0.0162	0.0493
	nd11	0.0196	
	co00	0.0208	
	wy99	0.0218	
	la12	0.0230	
	nd07	0.0306	
	ne15	0.0326	0.0287
	or98	0.0385	
	ca42	0.0429	0.0044
	la30	0.0453	
	10 of 30 sites (33%)		
26 of 39 sites with decreasing H+ also had decreasing SO42-			
26 of 59 sites with decreasing SO42- also had decreasing H+			

Table 4. Departures of observed 1995 bi-monthly and annual mean sulfate ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	42.76	48.81	-6.05	49.65	35.91	13.74	47.08	52.51	-5.43	43.42	60.02	-16.60	44.03	66.03	-22.00	45.14	46.38	-1.24	27.24	32.01	-4.77
	il18	37.22	41.87	-4.65	19.08	31.61	-12.53	50.66	53.23	-2.57	58.10	46.72	11.38	37.53	47.72	-10.19	31.81	37.24	-5.43	26.15	34.70	-8.55
	il63	31.99	43.16	-11.17	27.22	36.01	-8.79	30.24	46.20	-15.96	54.17	52.51	1.66	29.42	49.63	-20.21	21.70	40.64	-18.94	29.16	33.97	-4.81
	in20	53.61	44.84	8.77	35.69	34.72	0.97	49.15	44.12	5.03	66.46	50.95	15.51	86.55	59.52	27.03	50.62	48.20	2.42	33.20	31.56	1.64
	in34	53.80	52.30	1.50	40.88	41.45	-0.57	47.56	56.88	-9.32	64.34	62.70	1.64	75.14	69.71	5.43	59.36	45.35	14.01	35.50	37.73	-2.23
	in41	57.93	49.87	8.06	70.54	40.39	30.15	71.72	49.92	21.80	57.72	66.79	-9.07	84.01	56.98	27.03	29.91	49.22	-19.31	33.66	35.91	-2.25
	ky03	28.64	42.72	-14.08	24.42	31.14	-6.72	30.37	44.91	-14.54	35.19	59.50	-24.31	35.95	54.07	-18.12	29.21	40.35	-11.14	16.72	26.35	-9.63
	ky22	33.59	30.69	2.90	12.79	20.21	-7.42	23.05	30.49	-7.44	36.74	41.14	-4.40	69.41	45.57	23.84	39.17	28.93	10.24	20.35	17.83	2.52
	ky38	29.26	34.50	-5.24	25.02	30.09	-5.07	25.44	38.97	-13.53	34.88	39.70	-4.82	20.12	42.08	-21.96	40.04	30.68	9.36	30.05	25.45	4.60
	ma08	31.14	31.10	0.04	23.71	21.63	2.08	34.37	30.33	4.04	34.05	46.77	-12.72	67.25	42.01	25.24	13.86	25.88	-12.02	13.62	19.96	-6.34
	ma13	33.85	40.28	-6.43	33.82	27.51	6.31	46.12	38.47	7.65	49.76	57.45	-7.69	40.32	52.40	-12.08	13.14	38.20	-25.06	19.97	27.64	-7.67
	md03	34.64	51.79	-17.15	21.33	37.01	-15.68	51.39	50.93	0.46	51.60	72.90	-21.30	39.08	86.47	-47.39	20.28	32.61	-12.33	24.18	30.84	-6.66
	md13	36.89	43.24	-6.35	21.93	32.02	-10.09	34.95	40.81	-5.86	47.15	55.06	-7.91	68.23	66.53	1.70	15.60	36.17	-20.57	33.46	28.85	4.61
	me00	18.66	24.24	-5.58	8.07	15.27	-7.20	30.71	26.63	4.08	22.56	30.37	-7.81	20.22	31.05	-10.83	20.06	24.87	-4.81	10.36	17.25	-6.89
	me09	16.49	21.97	-5.48	7.55	12.24	-4.69	24.25	19.83	4.42	17.56	29.11	-11.55	25.36	33.11	-7.75	13.37	24.80	-11.43	10.82	12.72	-1.90
	mi09	33.22	30.91	2.31	24.86	19.52	5.34	34.90	34.81	0.09	46.20	41.18	5.02	41.95	35.94	6.01	29.36	30.34	-0.98	22.05	23.69	-1.64
	mi26	49.19	38.54	10.65	36.48	30.46	6.02	51.17	41.34	9.83	59.68	52.00	7.68	76.10	41.26	34.84	32.09	36.51	-4.42	39.60	29.69	9.91
	mi53	34.10	37.10	-3.00	21.11	25.61	-4.50	39.09	41.63	-2.54	59.76	44.90	14.86	40.43	45.97	-5.54	23.64	36.76	-13.12	20.55	27.75	-7.20
	mi98	25.33	28.96	-3.63	18.73	16.99	1.74	23.69	39.43	-15.74	37.33	35.10	2.23	28.71	31.47	-2.76	28.83	28.83	0.00	14.67	21.92	-7.25
	mi99	19.75	22.26	-2.51	16.88	13.54	3.34	20.20	30.77	-10.57	21.30	26.57	-5.27	23.28	22.89	0.39	25.47	22.37	3.10	11.36	17.42	-6.06
	nh02	26.91	31.22	-4.31	17.99	15.73	2.26	33.67	27.16	6.51	24.32	42.01	-17.69	41.84	50.22	-8.38	26.09	33.00	-6.91	17.52	19.21	-1.69
	nj99	36.76	45.02	-8.26	24.44	31.64	-7.20	44.70	42.31	2.39	42.19	59.46	-17.27	72.38	68.15	4.23	16.70	39.84	-23.14	20.18	28.70	-8.52
	ny08	47.64	54.47	-6.83	29.30	35.15	-5.85	67.09	46.88	20.21	56.96	75.23	-18.27	75.92	85.12	-9.20	36.48	52.84	-16.36	20.10	31.61	-11.51
	ny20	30.01	32.28	-2.27	15.62	16.84	-1.22	27.47	29.90	-2.43	44.11	44.38	-0.27	56.39	52.43	3.96	22.56	32.87	-10.31	13.93	17.27	-3.34
	ny52	42.89	46.28	-3.39	25.05	29.70	-4.65	50.97	41.62	9.35	35.44	61.40	-25.96	70.29	72.60	-2.31	49.63	44.01	5.62	25.97	28.36	-2.39
	ny65	40.35	46.66	-6.31	11.72	21.43	-9.71	42.41	46.94	-4.53	51.28	68.99	-17.71	81.25	70.85	10.40	36.71	46.97	-10.26	18.71	24.78	-6.07
	ny68	31.61	40.40	-8.79	14.07	26.28	-12.21	37.27	34.14	3.13	39.68	55.99	-16.31	61.77	68.23	-6.46	20.36	35.92	-15.56	16.48	21.81	-5.33
	ny98	26.77	29.24	-2.47	15.46	16.32	-0.86	26.87	27.67	-0.80	42.74	39.39	3.35	42.06	43.52	-1.46	16.31	31.86	-15.55	17.20	16.68	0.52
	ny99	37.44	40.79	-3.35	19.33	31.51	-12.18	41.37	42.37	-1.00	62.61	50.37	12.24	69.97	60.48	9.49	16.41	35.07	-18.66	14.97	24.93	-9.96
	oh17	46.26	58.96	-12.70	23.94	45.92	-21.98	56.09	59.07	-2.98	56.66	78.64	-21.98	60.82	77.30	-16.48	39.64	55.44	-15.80	40.41	37.37	3.04
	oh49	54.05	66.95	-12.90	36.49	46.99	-10.50	63.21	63.77	-0.56	56.77	89.18	-32.41	62.39	88.79	-26.40	56.96	65.58	-8.62	48.48	47.41	1.07
	oh71	50.34	58.92	-8.58	28.89	46.94	-18.05	70.92	60.42	10.50	60.33	75.51	-15.18	59.37	76.60	-17.23	46.00	53.85	-7.85	36.53	40.22	-3.69
	pa15	43.79	49.17	-5.38	17.97	27.88	-9.91	63.37	42.78	20.59	64.15	66.18	-2.03	73.56	84.26	-10.70	26.61	48.94	-22.33	17.07	25.01	-7.94
	pa29	46.35	53.51	-7.16	34.92	34.29	0.63	56.98	47.78	9.20	46.91	75.22	-28.31	70.49	79.16	-8.67	44.18	51.71	-7.53	24.60	32.92	-8.32
	pa42	41.96	49.11	-7.15	17.55	29.67	-12.12	60.93	42.95	17.98	58.99	68.20	-9.21	67.87	82.00	-14.13	25.82	46.29	-20.47	20.57	25.57	-5.00
	pa72	37.30	39.59	-2.29	20.57	25.99	-5.42	34.41	38.71	-4.30	59.13	50.83	8.30	81.19	65.58	15.61	16.48	34.43	-17.95	12.00	22.01	-10.01
	va00	35.59	42.00	-6.41	22.80	35.38	-12.58	47.67	38.87	8.80	54.90	59.07	-4.17	48.89	58.38	-9.49	16.68	35.14	-18.46	22.59	25.13	-2.54
	va13	28.82	36.92	-8.10	18.24	22.80	-4.56	42.29	34.12	8.17	33.12	56.04	-22.92	34.69	58.56	-23.87	27.46	32.49	-5.03	17.12	17.48	-0.36
	va28	19.44	26.60	-7.16	13.07	18.76	-5.69	32.47	23.62	8.85	25.70	38.66	-12.96	24.53	40.61	-16.08	11.31	25.15	-13.84	9.58	12.78	-3.20
	vt01	34.65	42.09	-7.44	31.37	27.31	4.06	39.28	41.34	-2.06	44.49	61.31	-16.82	60.03	62.61	-2.58	17.83	37.03	-19.20	14.91	22.94	-8.03
	vt99	25.47	35.73	-10.26	13.90	24.36	-10.46	29.03	32.94	-3.91	35.66	49.54	-13.88	38.02	47.65	-9.63	19.49	37.33	-17.84	16.73	22.58	-5.85
	wi28	30.89	25.47	5.42	29.28	19.22	10.06	29.76	33.85	-4.09	38.62	28.48	10.14	38.44	24.65	13.79	25.75	25.28	0.47	23.47	21.32	2.15
	wi36	16.89	19.72	-2.83	14.11	10.02	4.09	17.47	25.83	-8.36	22.00	24.10	-2.10	19.91	21.18	-1.27	18.60	22.35	-3.75	9.27	14.87	-5.60
	wi37	18.41	20.43	-2.02	19.20	14.11	5.09	19.22	23.55	-4.33	20.74	26.11	-5.37	21.10	19.53	1.57	18.43	23.40	-4.97	11.78	15.86	-4.08
	wi99	34.28	37.37	-3.09	13.65	30.24	-16.59	41.74	45.64	-3.90	46.77	41.98	4.79	44.04	42.50	1.54	32.62	33.23	-0.61	26.86	30.62	-3.76
	wv04	29.27	32.08	-2.81	14.86	22.05	-7.19	39.89	34.88	5.01	31.51	39.68	-8.17	37.40	44.59	-7.19	29.98	31.74	-1.76	22.01	19.51	2.50
	wv18	39.67	56.65	-16.98	27.49	38.70	-11.21	54.51	49.16	5.35	43.17	77.24	-34.07	55.77	90.16	-34.39	23.70	55.96	-32.26	33.37	28.71	4.66

Table 4 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	20.93	21.66	-0.73	21.78	20.30	1.48	16.15	23.31	-7.16	31.02	26.15	4.87	18.20	26.34	-8.14	23.27	18.22	5.05	15.17	15.66	-0.49
	fl03	17.77	22.82	-5.05	16.35	21.20	-4.85	16.67	19.71	-3.04	15.53	26.39	-10.86	22.15	27.70	-5.55	22.78	19.49	3.29	13.15	22.43	-9.28
	fl11	17.78	15.03	2.75	22.10	17.09	5.01	21.94	18.74	3.20	12.01	11.05	0.96	15.55	14.99	0.56	13.50	11.99	1.51	21.58	16.30	5.28
	fl41	16.54	19.05	-2.51	16.30	14.72	1.58	20.62	19.93	0.69	11.95	16.81	-4.86	25.82	27.93	-2.11	12.11	19.35	-7.24	12.43	15.59	-3.16
	ga41	25.69	25.35	0.34	19.59	19.93	-0.34	25.39	21.99	3.40	26.50	37.91	-11.41	42.53	29.86	12.67	14.94	24.79	-9.85	25.21	17.64	7.57
	ms10	21.32	18.09	3.23	23.93	14.81	9.12	18.96	21.69	-2.73	29.67	21.81	7.86	20.30	20.60	-0.30	18.32	17.17	1.15	16.77	12.49	4.28
	ms30	19.10	15.93	3.17	22.60	18.05	4.55	18.20	16.37	1.83	23.88	16.28	7.60	16.51	17.26	-0.75	21.40	15.79	5.61	11.98	11.81	0.17
	nc03	23.71	26.04	-2.33	17.47	21.78	-4.31	30.25	24.40	5.85	27.14	33.27	-6.13	28.60	33.91	-5.31	19.44	23.47	-4.03	19.38	19.39	-0.01
	nc25	22.02	22.64	-0.62	14.43	15.61	-1.18	26.62	22.10	4.52	32.02	33.20	-1.18	28.61	33.93	-5.32	18.97	17.26	1.71	11.48	13.71	-2.23
	nc34	33.18	39.49	-6.31	25.42	31.80	-6.38	45.71	32.78	12.93	38.71	52.64	-13.93	39.01	63.24	-24.23	26.64	30.31	-3.67	23.58	26.18	-2.60
	nc36	26.61	34.58	-7.97	22.50	30.68	-8.18	36.54	37.40	-0.86	22.53	46.43	-23.90	31.89	39.23	-7.34	17.73	28.58	-10.85	28.48	25.15	3.33
	nc41	23.45	28.29	-4.84	16.29	24.06	-7.77	30.41	27.03	3.38	34.14	35.42	-1.28	20.74	38.33	-17.59	13.85	23.89	-10.04	25.29	21.04	4.25
	sc06	22.03	25.26	-3.23	22.96	18.81	4.15	18.92	23.19	-4.27	19.78	38.63	-18.85	33.15	30.42	2.73	14.83	22.06	-7.23	22.55	18.45	4.10
	tn00	44.78	40.14	4.64	36.74	32.63	4.11	49.42	37.41	12.01	49.93	52.75	-2.82	66.47	53.09	13.38	41.72	36.96	4.76	24.40	28.02	-3.62
	tn11	21.74	29.97	-8.23	14.31	16.94	-2.63	20.33	24.24	-3.91	32.68	43.91	-11.23	28.72	45.46	-16.74	14.61	33.70	-19.09	19.79	15.57	4.22
West	ar02	24.74	20.57	4.17	22.08	18.59	3.49	16.36	21.83	-5.47	28.07	22.12	5.95	18.95	27.43	-8.48	50.82	17.28	33.54	12.18	16.14	-3.96
	ar03	28.63	23.27	5.36	23.08	21.08	2.00	22.63	24.61	-1.98	29.01	29.51	-0.50	29.03	28.45	0.58	39.80	18.01	21.79	28.20	17.95	10.25
	ar27	23.65	19.91	3.74	11.74	19.37	-7.63	23.70	22.43	1.27	25.62	19.68	5.94	19.54	23.76	-4.22	40.06	18.93	21.13	21.26	15.33	5.93
	az03	11.47	10.45	1.02	3.32	5.00	-1.68	5.54	7.97	-2.43	19.81	20.06	-0.25	17.43	14.11	3.32	12.78	9.63	3.15	9.96	5.89	4.07
	co00	16.02	11.75	4.27	5.30	5.90	-0.60	18.00	12.98	5.02	24.88	19.21	5.67	14.52	13.51	1.01	17.77	13.15	4.62	15.62	5.78	9.84
	co02	16.96	13.00	3.96	7.33	8.48	-1.15	11.09	10.66	0.43	37.19	17.86	19.33	19.72	18.53	1.19	18.95	13.53	5.42	7.45	8.94	-1.49
	co15	12.32	13.71	-1.39	3.42	7.26	-3.84	9.97	12.88	-2.91	16.43	19.06	-2.63	20.07	21.79	-1.72	16.44	13.18	3.26	7.56	8.10	-0.54
	co19	13.34	11.06	2.28	5.66	4.57	1.09	8.28	8.05	0.23	11.44	15.59	-4.15	21.16	19.83	1.33	19.07	13.36	5.71	14.42	4.93	9.49
	co22	17.27	12.41	4.86	5.68	6.72	-1.04	24.96	15.99	8.97	14.92	16.51	-1.59	25.89	14.85	11.04	18.06	14.49	3.57	14.12	5.91	8.21
	co97	15.15	18.46	-3.31	15.68	16.49	-0.81	13.00	19.14	-6.14	14.93	28.68	-13.75	18.75	19.41	-0.66	18.20	14.32	3.88	10.34	12.70	-2.36
	co98	9.63	9.23	0.40	5.33	5.22	0.11	6.66	8.37	-1.71	12.72	13.58	-0.86	12.48	13.48	-1.00	13.70	9.82	3.88	6.89	4.90	1.99
	co99	22.12	18.22	3.90	7.41	10.43	-3.02	9.36	15.60	-6.24	47.24	25.45	21.79	23.73	25.48	-1.75	18.88	21.36	-2.48	26.12	11.02	15.10
	ia08	31.29	34.17	-2.88	16.98	29.22	-12.24	34.78	45.86	-11.08	44.95	38.76	6.19	30.08	31.90	-1.82	35.35	29.82	5.53	25.62	29.45	-3.83
	ia23	29.83	26.93	2.90	28.22	25.44	2.78	43.92	32.90	11.02	19.84	33.11	-13.27	20.23	22.45	-2.22	34.27	22.28	11.99	32.47	25.39	7.08
	id03	11.85	8.81	3.04	11.64	5.98	5.66	5.57	9.79	-4.22	9.33	11.36	-2.03	18.39	12.84	5.55	21.51	8.67	12.84	4.66	4.22	0.44
	id11	6.19	8.77	-2.58	2.47	4.33	-1.86	7.06	8.79	-1.73	7.53	10.95	-3.42	12.12	16.66	-4.54	6.25	7.32	-1.07	1.73	4.59	-2.86
	ks31	25.03	25.82	-0.79	33.55	25.80	7.75	24.75	32.19	-7.44	24.67	28.05	-3.38	11.10	20.88	-9.78	22.86	27.44	-4.58	33.26	20.59	12.67
	ks32	17.83	17.72	0.11	9.90	15.91	-6.01	25.15	18.35	6.80	21.34	20.52	0.82	19.08	17.33	1.75	20.90	19.84	1.06	10.62	14.34	-3.72
	la12	21.64	18.78	2.86	24.72	18.10	6.62	22.60	22.81	-0.21	22.99	17.29	5.70	31.53	22.11	9.42	16.26	17.49	-1.23	11.75	14.90	-3.15
	la30	24.83	19.51	5.32	17.64	17.36	0.28	19.83	22.28	-2.45	21.74	20.65	1.09	53.30	23.90	29.40	23.59	18.85	4.74	12.87	14.02	-1.15
	mn16	12.89	13.77	-0.88	11.12	9.88	1.24	12.93	19.29	-6.36	18.85	14.72	4.13	15.91	12.91	3.00	11.54	13.98	-2.44	6.98	11.87	-4.89
	mn23	16.05	17.32	-1.27	13.44	8.12	5.32	25.85	22.45	3.40	20.86	17.83	3.03	17.61	17.20	0.41	8.47	19.36	-10.89	10.08	18.97	-8.89
	mo03	27.46	26.31	1.15	13.33	31.40	-18.07	33.27	29.53	3.74	25.43	26.50	-1.07	19.30	24.97	-5.67	49.76	25.70	24.06	23.68	19.74	3.94
	mt00	11.09	12.08	-0.99	8.02	7.32	0.70	9.84	13.03	-3.19	9.32	13.87	-4.55	19.04	18.35	0.69	13.99	11.92	2.07	6.31	7.99	-1.68
	mt05	5.57	6.64	-1.07	2.86	4.13	-1.27	6.78	7.48	-0.70	5.48	7.79	-2.31	8.92	8.26	0.66	5.88	7.78	-1.90	3.48	4.37	-0.89
	nd08	16.89	15.58	1.31	10.31	8.39	1.92	21.97	24.72	-2.75	25.14	14.93	10.21	12.50	14.35	-1.85	22.16	15.90	6.26	9.28	15.17	-5.89
	nm07	12.64	13.12	-0.48	5.76	9.02	-3.26	10.69	14.45	-3.76	16.00	19.24	-3.24	14.72	13.81	0.91	12.90	12.66	0.24	15.75	9.55	6.20
	nm08	19.75	15.06	4.69	18.24	11.93	6.31	28.75	21.54	7.21	29.00	19.80	9.20	14.82	15.28	-0.46	13.96	14.60	-0.64	13.70	7.19	6.51
	nm09	17.92	13.15	4.77	8.40	8.97	-0.57	11.50	10.38	1.12	27.68	20.74	6.94	27.48	16.23	11.25	19.48	14.22	5.26	12.99	8.37	4.62
	ok00	22.22	21.55	0.67	13.01	27.69	-14.68	20.00	24.17	-4.17	29.53	18.69	10.84	11.36	22.93	-11.57	27.44	21.12	6.32	31.98	14.69	17.29
	ok17	22.07	19.74	2.33	15.19	19.38	-4.19	27.01	22.84	4.17	27.45	21.87	5.58	16.98	19.13	-2.15	25.71	17.27	8.44	20.09	17.95	2.14
	or09	4.42	5.24	-0.82	1.07	2.55	-1.48	1.80	5.08	-3.28	4.70	7.91	-3.21	14.23	9.04	5.19	4.01	5.32	-1.31	0.69	1.55	-0.86
	or10	4.22	3.69	0.53	1.02	2.09	-1.07	4.41	3.67	0.74	5.48	4.14	1.34	8.50	5.79	2.71	3.90	3.52	0.38	2.02	2.95	-0.93
	or18	3.05	4.27	-1.22	1.06	1.85	-0.79	1.96	4.16	-2.20	4.98	5.76	-0.78	6.17	8.05	-1.88	3.23	3.85	-0.62	0.88	1.96	-1.08
	or97	5.18	6.04	-0.86	2.32	4.93	-2.61	6.31	7.40	-1.09	5.58	5.95	-0.37	9.34	7.43	1.91	3.35	5.74	-2.39	4.16	4.79	-0.63
	sd08	11.05	11.26	-0.21	4.72	5.47	-0.75	15.47	17.77	-2.30	11.92	11.37	0.55	15.95	12.05	3.90	9.91	12.25	-2.34	8.31	8.62	-0.31
	sd99	15.23	15.95	-0.72	12.62	14.39	-1.77	19.55	27.27	-7.72	13.20	14.58	-1.38	14.80	15.77	-0.97	24.92	15.03	9.89	6.29	8.63	-2.34

Table 4 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	29.23	27.53	1.70	42.15	34.36	7.79	35.34	35.83	-0.49	37.20	22.45	14.75	22.60	19.78	2.82	17.03	21.37	-4.34	21.08	31.39	-10.31
	tx10	21.80	21.58	0.22	23.84	29.35	-5.51	23.27	26.28	-3.01	14.38	20.56	-6.18	28.53	19.10	9.43	19.45	15.79	3.66	21.32	18.39	2.93
	tx16	28.54	23.47	5.07	30.12	21.68	8.44	24.55	27.67	-3.12	26.31	24.18	2.13	25.18	20.28	4.90	31.49	19.11	12.38	33.59	27.88	5.71
	tx21	33.19	27.87	5.32	25.49	26.70	-1.21	31.22	29.22	2.00	24.22	29.01	-4.79	46.32	35.01	11.31	34.90	24.91	9.99	36.99	22.36	14.63
	tx56	25.47	20.44	5.03	19.79	22.56	-2.77	29.02	31.82	-2.80	27.19	19.18	8.01	19.59	16.89	2.70	38.49	13.30	25.19	18.76	18.88	-0.12
	wa14	5.53	4.68	0.85	2.79	3.99	-1.20	5.74	3.87	1.87	8.80	6.40	2.40	6.54	5.39	1.15	4.54	3.75	0.79	4.77	4.66	0.11
	wa21	9.07	10.78	-1.71	4.47	4.46	0.01	7.67	10.04	-2.37	14.18	11.73	2.45	17.04	20.19	-3.15	7.80	11.20	-3.40	3.26	7.07	-3.81
	wy02	10.43	7.92	2.51	7.62	3.21	4.41	13.69	9.04	4.65	8.50	7.79	0.71	13.99	15.88	-1.89	16.14	7.56	8.58	2.66	4.04	-1.38
	wy08	6.02	8.44	-2.42	3.23	4.45	-1.22	4.81	8.09	-3.28	9.37	12.52	-3.15	9.68	14.00	-4.32	7.16	8.43	-1.27	1.87	3.14	-1.27
	wy99	16.57	12.91	3.66	9.92	9.48	0.44	17.41	16.29	1.12	17.65	15.21	2.44	18.78	15.39	3.39	18.14	12.86	5.28	17.55	8.21	9.34

Table 5. Departures of observed 1995 bi-monthly and annual mean hydrogen ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	33.91	42.28	-8.37	53.89	40.59	13.30	29.92	37.02	-7.10	24.14	46.02	-21.88	43.73	57.86	-14.13	29.11	39.62	-10.51	22.64	32.58	-9.94
	il18	25.83	29.26	-3.43	21.22	32.03	-10.81	29.63	29.26	0.37	46.32	27.18	19.14	25.77	32.15	-6.38	16.73	25.67	-8.94	15.30	29.24	-13.94
	il63	27.69	41.33	-13.64	25.35	40.33	-14.98	24.98	34.97	-9.99	38.16	46.68	-8.52	27.14	49.69	-22.55	20.62	39.93	-19.31	29.86	36.41	-6.55
	in20	42.89	44.26	-1.37	37.60	42.73	-5.13	33.04	39.29	-6.25	38.56	43.33	-4.77	79.34	58.93	20.41	45.25	45.13	0.12	23.55	36.18	-12.63
	in34	26.81	30.83	-4.02	25.06	28.37	-3.31	29.42	24.95	4.47	34.03	36.79	-2.76	43.58	38.66	4.92	15.47	28.39	-12.92	13.30	27.79	-14.49
	in41	42.84	40.58	2.26	58.27	40.48	17.79	28.26	34.44	-6.18	40.44	44.59	-4.15	79.37	47.04	32.33	26.31	41.04	-14.73	24.40	35.92	-11.52
	ky03	26.67	39.99	-13.32	25.68	33.18	-7.50	27.44	39.47	-12.03	28.10	49.17	-21.07	36.24	50.97	-14.73	24.04	39.91	-15.87	18.50	27.24	-8.74
	ky22	34.03	32.82	1.21	17.42	22.46	-5.04	21.27	30.51	-9.24	31.80	41.23	-9.43	70.55	49.33	21.22	39.97	33.48	6.49	23.19	19.90	3.29
	ky38	27.19	31.72	-4.53	26.26	31.31	-5.05	22.67	28.94	-6.27	20.97	33.70	-12.73	22.79	38.53	-15.74	39.17	31.32	7.85	31.28	26.54	4.74
	ma08	38.02	39.47	-1.45	35.75	35.47	0.28	39.99	36.34	3.65	38.18	51.84	-13.66	78.75	48.61	30.14	10.82	34.39	-23.57	24.65	30.15	-5.50
	ma13	38.64	40.01	-1.37	38.62	28.89	9.73	49.79	36.36	13.43	54.72	53.04	1.68	55.01	53.82	1.19	13.36	39.87	-26.51	20.33	28.06	-7.73
	md03	37.76	57.58	-19.82	24.63	49.21	-24.58	48.31	54.62	-6.31	51.48	72.21	-20.73	46.16	94.80	-48.64	20.56	37.03	-16.47	35.40	37.64	-2.24
	md13	39.82	45.36	-5.54	27.19	39.78	-12.59	35.77	40.42	-4.65	41.30	52.65	-11.35	77.37	67.94	9.43	15.60	38.53	-22.93	41.66	32.83	8.83
	me00	22.30	25.14	-2.84	16.79	24.22	-7.43	33.70	24.94	8.76	26.91	25.58	1.33	20.66	27.69	-7.03	21.29	25.05	-3.76	14.46	23.36	-8.90
	me09	21.51	27.87	-6.36	16.99	25.48	-8.49	34.31	26.21	8.10	18.74	29.81	-11.07	28.01	34.94	-6.93	14.70	29.66	-14.96	16.34	21.13	-4.79
	mi09	28.71	29.67	-0.96	32.98	32.32	0.66	30.53	34.39	-3.86	31.32	30.35	0.97	31.65	28.00	3.65	18.98	25.68	-6.70	26.78	27.28	-0.50
	mi26	37.28	35.23	2.05	44.54	34.06	10.48	28.45	35.89	-7.44	45.37	36.39	8.98	56.61	36.19	20.42	24.44	34.64	-10.20	24.28	34.24	-9.96
	mi53	29.67	31.23	-1.56	23.21	32.71	-9.50	35.33	33.08	2.25	42.83	27.77	15.06	40.52	35.24	5.28	15.50	29.41	-13.91	20.60	29.19	-8.59
	mi98	23.91	26.63	-2.72	25.62	27.13	-1.51	25.16	31.07	-5.91	27.30	25.13	2.17	24.68	25.28	-0.60	21.29	25.39	-4.10	19.41	25.79	-6.38
	mi99	16.27	18.79	-2.52	24.47	20.28	4.19	22.48	23.16	-0.68	16.74	17.52	-0.78	8.39	13.77	-5.38	11.25	16.11	-4.86	14.30	21.88	-7.58
	nh02	37.54	40.54	-3.00	44.30	33.32	10.98	44.69	36.56	8.13	30.89	44.65	-13.76	47.80	56.27	-8.47	29.88	41.23	-11.35	27.66	31.21	-3.55
	nj99	42.10	45.13	-3.03	33.70	37.34	-3.64	45.28	42.37	2.91	44.05	54.84	-10.79	79.50	65.86	13.64	18.03	39.10	-21.07	32.06	31.26	0.80
	ny08	47.43	55.22	-7.79	47.71	45.42	2.29	63.02	47.69	15.33	47.78	64.70	-16.92	63.05	79.22	-16.17	35.97	53.63	-17.66	27.04	40.67	-13.63
	ny20	35.82	41.25	-5.43	34.60	36.16	-1.56	34.79	38.79	-4.00	42.09	44.95	-2.86	54.90	59.31	-4.41	25.73	39.66	-13.93	22.82	28.64	-5.82
	ny52	44.73	50.85	-6.12	34.15	45.19	-11.04	48.12	47.92	0.20	35.23	56.23	-21.00	68.28	72.35	-4.07	49.07	47.27	1.80	33.50	36.11	-2.61
	ny65	45.88	54.75	-8.87	21.12	38.90	-17.78	43.99	53.34	-9.35	49.39	69.82	-20.43	97.98	76.44	21.54	36.81	55.26	-18.45	25.99	34.74	-8.75
	ny68	38.65	49.99	-11.34	26.75	42.97	-16.22	43.29	43.83	-0.54	43.03	61.30	-18.27	68.36	76.95	-8.59	24.63	43.62	-18.99	25.85	31.28	-5.43
	ny98	32.96	33.48	-0.52	29.00	30.96	-1.96	34.53	31.42	3.11	45.33	35.86	9.47	45.17	43.93	1.24	17.32	33.92	-16.60	26.43	24.77	1.66
	ny99	42.35	50.22	-7.87	29.11	45.77	-16.66	45.39	51.29	-5.90	59.82	55.39	4.43	82.59	70.41	12.18	15.17	42.97	-27.80	22.02	35.47	-13.45
	oh17	45.59	55.59	-10.00	32.02	52.20	-20.18	46.33	53.49	-7.16	52.23	63.41	-11.18	65.25	70.80	-5.55	41.12	53.60	-12.48	36.61	40.04	-3.43
	oh49	54.36	67.60	-13.24	40.98	56.68	-15.70	59.98	66.21	-6.23	57.47	84.14	-26.67	65.62	82.56	-16.94	48.70	62.85	-14.15	53.42	53.14	0.28
	oh71	46.31	54.14	-7.83	30.81	51.23	-20.42	60.11	56.22	3.89	43.37	60.93	-17.56	59.91	65.93	-6.02	46.80	49.84	-3.04	36.84	40.72	-3.88
	pa15	48.59	54.37	-5.78	29.32	42.61	-13.29	67.08	48.75	18.33	63.91	65.18	-1.27	81.22	85.31	-4.09	24.96	53.13	-28.17	25.05	31.25	-6.20
	pa29	54.26	58.15	-3.89	52.25	50.99	1.26	58.19	52.27	5.92	49.30	71.70	-22.40	84.76	79.41	5.35	48.42	54.45	-6.03	32.66	40.05	-7.39
	pa42	48.93	56.90	-7.97	32.02	47.23	-15.21	61.96	51.52	10.44	62.08	69.90	-7.82	79.86	86.34	-6.48	26.36	51.27	-24.91	31.30	35.16	-3.86
	pa72	45.62	49.00	-3.38	36.52	43.41	-6.89	37.70	49.00	-11.30	64.40	56.57	7.83	90.72	74.47	16.25	21.00	39.84	-18.84	23.37	30.71	-7.34
	va00	38.87	44.94	-6.07	30.60	45.15	-14.55	49.04	39.55	9.49	51.17	56.14	-4.97	54.65	58.03	-3.38	19.70	41.53	-21.83	28.05	29.23	-1.18
	va13	28.92	36.72	-7.80	22.70	26.14	-3.44	39.49	32.87	6.62	25.35	51.75	-26.40	36.42	57.23	-20.81	25.53	29.75	-4.22	24.05	22.55	1.50
	va28	20.35	27.60	-7.25	13.40	22.32	-8.92	32.93	23.94	8.99	26.27	36.42	-10.15	23.93	39.31	-15.38	13.45	27.61	-14.16	12.13	15.98	-3.85
	vt01	42.53	51.04	-8.51	54.53	44.58	9.95	45.08	51.26	-6.18	43.49	62.91	-19.42	63.81	67.60	-3.79	22.62	44.97	-22.35	25.67	34.90	-9.23
	vt99	31.20	42.14	-10.94	32.73	45.17	-12.44	35.20	38.91	-3.71	32.56	45.31	-12.75	37.48	45.89	-8.41	20.08	40.93	-20.85	29.16	36.64	-7.48
	wi28	18.77	14.88	3.89	12.97	20.62	-7.65	25.51	16.31	9.20	18.88	10.05	8.83	22.55	10.70	11.85	12.81	12.30	0.51	19.88	19.32	0.56
	wi36	15.15	15.82	-0.67	16.91	18.78	-1.87	16.01	13.17	2.84	13.58	14.06	-0.48	16.82	14.22	2.60	13.21	14.84	-1.63	14.39	19.88	-5.49
	wi37	11.53	12.46	-0.93	16.02	19.40	-3.38	12.63	14.50	-1.87	12.23	8.42	3.81	6.91	7.04	-0.13	6.51	9.28	-2.77	14.90	16.13	-1.23
	wi99	23.65	30.19	-6.54	17.29	35.18	-17.89	35.48	30.33	5.15	27.58	28.22	-0.64	30.67	29.03	1.64	13.33	26.02	-12.69	17.57	32.39	-14.82
	wv04	34.32	38.14	-3.82	24.27	30.87	-6.60	42.64	39.61	3.03	28.69	44.16	-15.47	43.36	50.71	-7.35	34.37	37.18	-2.81	32.58	26.32	6.26
	wv18	43.29	60.20	-16.91	40.10	45.87	-5.77	50.16	51.68	-1.52	39.12	76.97	-37.85	58.33	93.21	-34.88	27.97	59.55	-31.58	44.05	33.93	10.12

Table 5 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	22.02	23.86	-1.84	20.87	23.53	-2.66	14.19	17.33	-3.14	34.56	27.95	6.61	20.76	30.69	-9.93	24.72	23.89	0.83	17.00	19.75	-2.75
	fl03	17.53	23.26	-5.73	11.85	18.80	-6.95	15.64	15.37	0.27	12.70	25.71	-13.01	26.02	33.48	-7.46	26.36	25.14	1.22	12.59	21.08	-8.49
	fl11	12.72	9.27	3.45	14.98	8.70	6.28	13.79	8.62	5.17	9.37	9.08	0.29	10.93	11.05	-0.12	7.43	8.04	-0.61	19.80	10.14	9.66
	fl41	15.45	17.48	-2.03	12.92	11.81	1.11	17.29	14.41	2.88	11.04	12.24	-1.20	30.35	34.24	-3.89	10.29	20.39	-10.10	10.82	11.77	-0.95
	ga41	21.68	25.30	-3.62	13.14	20.02	-6.88	20.60	18.52	2.08	8.43	33.46	-25.03	45.80	35.88	9.92	17.37	26.09	-8.72	24.74	17.81	6.93
	ms10	17.68	17.02	0.66	20.66	14.25	6.41	11.28	11.00	0.28	18.45	19.31	-0.86	22.75	24.31	-1.56	17.29	19.96	-2.67	15.66	13.30	2.36
	ms30	18.08	17.85	0.23	23.26	22.47	0.79	14.18	12.41	1.77	24.57	17.36	7.21	20.53	22.47	-1.94	15.24	18.65	-3.41	10.71	13.76	-3.05
	nc03	23.68	26.24	-2.56	18.52	25.70	-7.18	29.25	22.91	6.34	23.90	29.82	-5.92	31.29	36.81	-5.52	18.32	21.41	-3.09	20.82	20.77	0.05
	nc25	21.72	23.61	-1.89	15.70	17.43	-1.73	23.13	18.18	4.95	28.12	31.97	-3.85	28.52	38.29	-9.77	21.07	19.66	1.41	13.81	16.15	-2.34
	nc34	29.96	35.99	-6.03	25.39	32.84	-7.45	31.61	28.77	2.84	34.43	42.96	-8.53	41.18	59.99	-18.81	25.61	25.74	-0.13	21.53	25.67	-4.14
	nc36	28.24	36.90	-8.66	26.10	34.64	-8.54	34.85	35.43	-0.58	23.98	47.94	-23.96	34.00	44.67	-10.67	19.03	31.14	-12.11	31.50	27.61	3.89
	nc41	20.50	24.39	-3.89	12.97	22.66	-9.69	24.28	20.16	4.12	29.43	26.10	3.33	19.13	38.10	-18.97	12.24	20.62	-8.38	24.95	18.69	6.26
	sc06	19.62	25.18	-5.56	21.66	20.32	1.34	15.05	18.74	-3.69	20.12	35.17	-15.05	31.25	33.45	-2.20	6.93	23.82	-16.89	22.72	19.59	3.13
	tn00	43.06	44.67	-1.61	39.39	39.11	0.28	39.81	36.35	3.46	37.84	54.57	-16.73	72.30	60.48	11.82	44.40	43.53	0.87	24.59	34.01	-9.42
	tn11	23.29	31.19	-7.90	18.30	20.81	-2.51	20.85	21.97	-1.12	27.25	42.48	-15.23	34.98	49.29	-14.31	15.67	32.92	-17.25	22.70	19.67	3.03
West	ar02	18.83	16.60	2.23	18.90	16.78	2.12	8.94	11.40	-2.46	18.17	15.15	3.02	20.54	25.57	-5.03	39.76	17.58	22.18	6.68	13.11	-6.43
	ar03	22.72	20.52	2.20	19.93	20.68	-0.75	10.85	14.88	-4.03	19.96	21.86	-1.90	25.86	28.31	-2.45	34.83	20.01	14.82	24.89	17.36	7.53
	ar27	13.42	10.59	2.83	7.92	12.40	-4.48	11.56	7.65	3.91	9.36	7.22	2.14	12.26	13.69	-1.43	27.45	13.21	14.24	11.96	9.36	2.60
	az03	5.95	5.95	0.00	6.06	5.79	0.27	6.31	3.59	2.72	4.27	5.89	-1.62	5.03	7.51	-2.48	4.86	6.99	-2.13	9.19	5.91	3.28
	co00	5.18	4.58	0.60	2.71	3.63	-0.92	2.44	3.62	-1.18	2.54	2.38	0.16	6.14	5.70	0.44	7.92	7.19	0.73	9.33	4.97	4.36
	co02	11.27	12.21	-0.94	10.01	12.59	-2.58	6.22	7.13	-0.91	11.86	12.60	-0.74	22.43	15.84	6.59	8.49	14.76	-6.27	8.61	10.35	-1.74
	co15	9.89	11.21	-1.32	5.12	11.12	-6.00	6.27	7.08	-0.81	11.87	8.31	3.56	14.72	15.18	-0.46	15.69	12.17	3.52	5.67	13.37	-7.70
	co19	12.65	9.79	2.86	13.81	7.40	6.41	4.89	6.46	-1.57	10.20	7.60	2.60	19.92	16.01	3.91	11.87	12.40	-0.53	15.21	8.89	6.32
	co22	6.94	4.97	1.97	8.63	8.15	0.48	5.87	2.32	3.55	4.61	2.06	2.55	1.98	2.67	-0.69	12.67	5.63	7.04	7.89	8.97	-1.08
	co97	14.90	15.08	-0.18	19.44	14.27	5.17	8.53	13.10	-4.57	13.67	18.99	-5.32	21.95	16.81	5.14	15.65	13.73	1.92	10.14	13.58	-3.44
	co98	10.20	9.32	0.88	7.88	9.04	-1.16	7.54	5.77	1.77	11.81	7.67	4.14	15.85	13.44	2.41	11.07	10.96	0.11	7.06	9.04	-1.98
	co99	12.88	12.21	0.67	9.33	9.89	-0.56	10.25	6.80	3.45	7.48	12.02	-4.54	13.66	22.66	-9.00	22.00	12.93	9.07	14.58	8.95	5.63
	ia08	8.72	16.22	-7.50	5.44	26.16	-20.72	9.24	18.16	-8.92	13.82	9.45	4.37	1.99	14.53	-12.54	7.43	13.06	-5.63	14.39	15.96	-1.57
	ia23	11.21	11.95	-0.74	30.75	17.15	13.60	6.10	9.71	-3.61	5.40	8.06	-2.66	2.20	7.26	-5.06	18.39	13.04	5.35	4.39	16.48	-12.09
	id03	5.67	4.81	0.86	13.97	5.58	8.39	1.86	2.99	-1.13	4.79	2.23	2.56	4.30	4.51	-0.21	6.91	6.28	0.63	2.21	7.29	-5.08
	id11	2.90	3.09	-0.19	3.76	3.72	0.04	2.37	2.18	0.19	1.82	1.81	0.01	2.91	3.39	-0.48	3.02	3.71	-0.69	3.55	3.75	-0.20
	ks31	13.79	11.44	2.35	26.03	14.72	11.31	9.50	11.24	-1.74	4.94	8.44	-3.50	8.97	7.55	1.42	10.48	11.54	-1.06	22.83	15.14	7.69
	ks32	2.84	3.48	-0.64	4.89	6.63	-1.74	1.18	2.67	-1.49	0.70	1.54	-0.84	3.40	1.86	1.54	3.08	3.40	-0.32	3.80	4.80	-1.00
	la12	15.40	15.06	0.34	13.86	12.22	1.64	8.69	9.23	-0.54	7.86	14.31	-6.45	34.86	25.98	8.88	17.80	19.26	-1.46	9.32	9.36	-0.04
	la30	20.51	18.61	1.90	12.41	15.67	-3.26	13.81	11.92	1.89	10.68	19.42	-8.74	53.66	30.82	22.84	23.18	20.41	2.77	9.32	13.40	-4.08
	mn16	12.65	10.01	2.64	19.76	16.73	3.03	13.26	9.38	3.88	16.78	5.95	10.83	8.10	6.37	1.73	6.94	8.09	-1.15	11.08	13.57	-2.49
	mn23	11.05	8.61	2.44	16.56	13.34	3.22	13.61	8.85	4.76	13.06	4.10	8.96	4.58	4.16	0.42	6.30	10.31	-4.01	12.17	10.92	1.25
	mo03	18.05	19.25	-1.20	15.35	28.76	-13.41	22.06	17.98	4.08	11.93	15.11	-3.18	13.59	15.90	-2.31	31.47	19.04	12.43	13.92	18.73	-4.81
	mt00	7.38	7.55	-0.17	8.62	10.01	-1.39	4.31	5.63	-1.32	7.22	4.88	2.34	6.74	7.00	-0.26	10.34	7.95	2.39	7.03	9.81	-2.78
	mt05	7.87	8.11	-0.24	5.54	7.94	-2.40	5.94	6.40	-0.46	8.46	7.77	0.69	12.03	10.01	2.02	8.15	8.71	-0.56	7.10	7.83	-0.73
	nd08	5.73	5.18	0.55	9.09	9.32	-0.23	11.93	4.98	6.95	0.45	1.93	-1.48	4.58	2.45	2.13	2.78	3.01	-0.23	5.55	9.37	-3.82
	nm07	10.44	10.90	-0.46	8.47	10.51	-2.04	7.89	7.53	0.36	9.36	10.60	-1.24	14.04	14.97	-0.93	8.92	12.02	-3.10	13.93	9.79	4.14
	nm08	3.51	5.22	-1.71	4.94	5.59	-0.65	4.59	3.15	1.44	0.52	3.27	-2.75	2.88	6.50	-3.62	5.60	7.22	-1.62	2.52	5.57	-3.05
	nm09	15.10	10.18	4.92	11.23	10.25	0.98	10.69	6.87	3.82	8.52	9.10	-0.58	26.69	15.74	10.95	17.95	10.27	7.68	15.54	8.84	6.70
	ok00	11.71	8.81	2.90	6.87	14.18	-7.31	5.05	3.63	1.42	3.03	5.31	-2.28	11.00	6.95	4.05	20.94	10.63	10.31	23.36	12.17	11.19
	ok17	12.78	9.53	3.25	12.87	14.65	-1.78	4.36	6.39	-2.03	7.38	8.28	-0.90	10.39	7.10	3.29	25.55	10.26	15.29	16.12	10.49	5.63
	or09	7.41	6.92	0.49	4.64	6.12	-1.48	4.08	6.62	-2.54	6.83	6.56	0.27	16.86	9.19	7.67	8.20	7.50	0.70	3.82	5.53	-1.71
	or10	6.16	5.84	0.32	3.92	4.58	-0.66	5.68	4.82	0.86	7.20	5.68	1.52	10.66	9.26	1.40	5.45	6.23	-0.78	4.07	4.46	-0.39
	or18	6.10	5.91	0.19	5.43	4.81	0.62	4.22	5.00	-0.78	7.01	5.38	1.63	10.79	8.99	1.80	5.35	6.35	-1.00	3.83	4.94	-1.11
	or97	4.70	3.98	0.72	4.03	4.41	-0.38	4.40	2.98	1.42	4.24	4.06	0.18	7.73	4.70	3.03	3.67	3.76	-0.09	4.13	4.00	0.13
	sd08	6.16	5.98	0.18	2.30	5.34	-3.04	4.07	4.99	-0.92	4.59	2.81	1.78	7.41	5.26	2.15	9.83	8.20	1.63	8.78	9.28	-0.50
	sd99	3.59	2.12	1.47	4.87	3.34	1.53	2.79	2.16	0.63	2.15	0.84	1.31	1.42	1.23	0.19	3.86	1.89	1.97	6.44	3.28	3.16

Table 5 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	10.44	13.10	-2.66	20.39	17.83	2.56	5.72	5.53	0.19	5.10	7.31	-2.21	14.54	14.22	0.32	8.14	14.96	-6.82	8.74	18.74	-10.00
	tx10	16.67	16.12	0.55	13.47	23.51	-10.04	11.45	13.53	-2.08	3.54	11.75	-8.21	28.64	18.11	10.53	23.89	16.99	6.90	19.03	12.83	6.20
	tx16	10.70	5.65	5.05	13.23	7.86	5.37	2.27	2.31	-0.04	2.78	3.81	-1.03	10.40	5.56	4.84	20.97	5.59	15.38	14.52	8.78	5.74
	tx21	26.59	22.57	4.02	21.75	23.19	-1.44	15.41	13.38	2.03	13.61	19.51	-5.90	40.19	34.49	5.70	36.94	25.59	11.35	31.65	19.28	12.37
	tx56	13.06	9.68	3.38	11.69	13.76	-2.07	8.20	8.79	-0.59	1.98	9.13	-7.15	12.79	7.81	4.98	28.93	9.41	19.52	14.76	9.17	5.59
	wa14	6.03	5.14	0.89	4.16	5.05	-0.89	4.66	5.49	-0.83	8.73	5.10	3.63	8.47	6.15	2.32	5.66	4.97	0.69	4.51	4.09	0.42
	wa21	11.11	12.26	-1.15	6.98	7.34	-0.36	8.81	11.26	-2.45	15.70	12.14	3.56	20.37	21.86	-1.49	10.13	11.85	-1.72	4.68	9.12	-4.44
	wy02	5.47	6.27	-0.80	3.13	6.12	-2.99	5.68	4.65	1.03	6.46	4.59	1.87	6.23	9.47	-3.24	7.35	6.56	0.79	3.96	6.26	-2.30
	wy08	5.47	4.19	1.28	5.55	4.65	0.90	4.20	2.91	1.29	7.36	2.16	5.20	7.57	5.51	2.06	5.95	4.85	1.10	2.17	5.07	-2.90
	wy99	7.67	6.81	0.86	4.08	8.43	-4.35	8.73	4.55	4.18	7.60	4.49	3.11	5.93	6.44	-0.51	11.14	7.19	3.95	8.54	9.77	-1.23

Table 6. Departures of observed 1995 bi-monthly and annual mean nitrate ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	26.75	23.90	2.85	38.56	21.22	17.34	26.43	28.69	-2.26	22.01	28.33	-6.32	25.36	28.30	-2.94	31.23	21.53	9.70	16.91	15.31	1.60
	il18	22.84	26.22	-3.38	16.55	25.26	-8.71	31.60	33.65	-2.05	31.15	29.02	2.13	20.87	25.36	-4.49	20.99	22.31	-1.32	15.85	21.74	-5.89
	il63	17.91	18.79	-0.88	14.77	16.58	-1.81	15.48	20.29	-4.81	28.14	24.19	3.95	20.25	21.98	-1.73	12.88	16.37	-3.49	15.94	13.35	2.59
	in20	34.62	26.17	8.45	25.79	28.47	-2.68	30.37	28.37	2.00	38.10	27.50	10.60	54.67	29.03	25.64	35.92	24.96	10.96	22.89	18.68	4.21
	in34	32.03	27.08	4.95	28.57	30.55	-1.98	30.23	31.00	-0.77	40.99	28.89	12.10	41.20	29.39	11.81	30.66	20.84	9.82	20.54	21.78	-1.24
	in41	35.07	23.95	11.12	60.32	25.23	35.09	42.05	23.87	18.18	30.57	32.41	-1.84	40.23	22.43	17.80	17.28	21.46	-4.18	19.99	18.33	1.66
	ky03	17.07	18.59	-1.52	17.33	15.00	2.33	17.09	22.32	-5.23	20.62	23.30	-2.68	21.42	21.55	-0.13	13.14	17.11	-3.97	12.82	12.27	0.55
	ky22	19.09	15.30	3.79	13.52	13.00	0.52	14.39	18.95	-4.56	18.22	18.88	-0.66	34.79	17.52	17.27	17.18	13.54	3.64	16.42	9.93	6.49
	ky38	17.42	17.18	0.24	13.57	13.75	-0.18	14.89	19.85	-4.96	23.51	21.05	2.46	14.64	21.63	-6.99	20.86	16.23	4.63	17.04	10.57	6.47
	ma08	24.30	21.28	3.02	24.26	20.17	4.09	28.94	22.92	6.02	22.33	28.86	-6.53	42.51	22.00	20.51	8.03	17.83	-9.80	19.72	15.91	3.81
	ma13	21.06	19.64	1.42	17.84	14.88	2.96	34.09	17.16	16.93	27.64	28.94	-1.30	29.94	25.95	3.99	5.96	18.14	-12.18	10.89	12.79	-1.90
	md03	22.28	26.67	-4.39	14.84	25.47	-10.63	34.56	29.25	5.31	32.78	35.03	-2.25	21.08	37.27	-16.19	8.88	15.81	-6.93	21.57	17.21	4.36
	md13	23.09	21.93	1.16	16.48	19.64	-3.16	23.29	22.89	0.40	26.94	26.36	0.58	38.23	27.34	10.89	7.15	18.95	-11.80	26.47	16.42	10.05
	me00	14.41	16.20	-1.79	15.26	21.86	-6.60	22.57	17.76	4.81	16.74	14.39	2.35	12.14	13.48	-1.34	11.34	12.57	-1.23	8.41	17.14	-8.73
	me09	12.74	14.98	-2.24	11.52	16.73	-5.21	21.55	16.53	5.02	10.51	15.50	-4.99	14.53	15.58	-1.05	7.06	12.97	-5.91	11.24	12.59	-1.35
	mi09	29.67	25.41	4.26	30.09	34.30	-4.21	32.91	26.01	6.90	31.75	26.65	5.10	27.12	21.24	5.88	21.72	18.08	3.64	34.42	26.17	8.25
	mi26	35.99	25.51	10.48	32.58	30.36	2.22	36.30	28.95	7.35	42.81	28.81	14.00	51.91	21.45	30.46	24.04	21.06	2.98	28.29	22.40	5.89
	mi53	30.01	30.40	-0.39	31.47	42.27	-10.80	32.92	32.76	0.16	40.24	28.35	11.89	30.35	26.06	4.29	19.37	22.17	-2.80	25.73	30.81	-5.08
	mi98	21.52	23.72	-2.20	19.15	27.79	-8.64	27.35	33.29	-5.94	27.02	22.14	4.88	23.85	17.37	6.48	18.81	18.02	0.79	12.93	23.72	-10.79
	mi99	18.14	18.37	-0.23	18.83	18.23	0.60	14.88	23.80	-8.92	17.82	18.66	-0.84	21.11	17.41	3.70	18.22	14.15	4.07	17.96	17.95	0.01
	nh02	23.68	22.42	1.26	36.65	22.60	14.05	32.59	22.19	10.40	16.99	25.10	-8.11	21.36	23.53	-2.17	14.07	21.43	-7.36	20.44	19.68	0.76
	nj99	26.01	23.73	2.28	18.21	21.46	-3.25	35.61	24.30	11.31	30.75	30.37	0.38	38.57	30.71	7.86	11.53	19.25	-7.72	21.37	16.27	5.10
	ny08	31.43	29.82	1.61	35.43	33.40	2.03	51.68	30.84	20.84	33.01	33.68	-0.67	31.00	31.52	-0.52	19.25	25.06	-5.81	18.22	24.40	-6.18
	ny20	22.99	21.69	1.30	29.15	26.06	3.09	26.63	23.66	2.97	28.11	23.58	4.53	21.81	20.59	1.22	13.09	17.95	-4.86	19.13	18.28	0.85
	ny52	36.70	32.09	4.61	40.58	41.03	-0.45	49.93	35.48	14.45	28.10	31.51	-3.41	39.18	29.76	9.42	25.39	25.43	-0.04	37.03	29.32	7.71
	ny65	25.39	25.91	-0.52	15.02	24.14	-9.12	31.03	30.91	0.12	27.94	31.99	-4.05	43.84	27.39	16.45	17.36	22.68	-5.32	17.14	18.34	-1.20
	ny68	22.58	25.63	-3.05	20.84	27.61	-6.77	27.36	29.51	-2.15	23.28	29.25	-5.97	31.29	30.98	0.31	13.30	20.30	-7.00	19.39	16.13	3.26
	ny98	21.27	18.24	3.03	23.23	21.44	1.79	26.56	20.44	6.12	25.71	20.00	5.71	21.46	16.78	4.68	10.19	14.74	-4.55	20.46	16.02	4.44
	ny99	25.36	22.28	3.08	16.89	21.47	-4.58	29.59	24.33	5.26	43.12	25.46	17.66	40.74	29.85	10.89	9.54	18.17	-8.63	12.26	14.40	-2.14
	oh17	29.64	29.94	-0.30	24.05	30.04	-5.99	36.14	33.72	2.42	29.77	37.88	-8.11	36.10	34.44	1.66	20.88	24.93	-4.05	30.90	18.64	12.26
	oh49	27.29	29.69	-2.40	27.39	30.19	-2.80	33.87	32.97	0.90	28.19	35.34	-7.15	27.99	31.69	-3.70	19.63	27.56	-7.93	26.70	20.39	6.31
	oh71	27.35	28.19	-0.84	18.67	27.97	-9.30	37.69	31.86	5.83	32.04	35.81	-3.77	32.42	31.01	1.41	20.70	23.88	-3.18	22.55	18.58	3.97
	pa15	28.13	25.02	3.11	21.18	24.92	-3.74	50.95	27.11	23.84	31.16	29.51	1.65	36.34	30.19	6.15	11.23	23.05	-11.82	17.94	15.32	2.62
	pa29	31.71	27.92	3.79	38.93	31.47	7.46	42.54	29.69	12.85	21.68	32.08	-10.40	39.65	29.72	9.93	25.44	23.71	1.73	22.02	20.84	1.18
	pa42	29.47	27.03	2.44	25.79	29.50	-3.71	44.48	30.02	14.46	33.64	29.50	4.14	37.31	31.75	5.56	13.17	22.80	-9.63	22.41	18.60	3.81
	pa72	27.78	25.32	2.46	23.39	26.59	-3.20	29.75	28.74	1.01	46.42	29.50	16.92	39.88	31.41	8.47	10.50	19.79	-9.29	16.74	15.88	0.86
	va00	20.81	20.25	0.56	17.87	21.69	-3.82	26.13	22.83	3.30	29.37	24.57	4.80	24.78	21.24	3.54	10.39	18.58	-8.19	16.33	12.60	3.73
	va13	17.04	17.98	-0.94	11.99	12.99	-1.00	25.00	20.27	4.73	19.10	25.62	-6.52	17.01	23.82	-6.81	15.42	15.87	-0.45	13.72	9.34	4.38
	va28	10.62	12.12	-1.50	8.44	11.03	-2.59	18.67	12.33	6.34	13.03	16.19	-3.16	10.42	14.93	-4.51	5.99	11.33	-5.34	7.17	6.92	0.25
	vt01	28.93	28.62	0.31	44.25	32.16	12.09	31.39	31.48	-0.09	28.36	32.96	-4.60	34.95	27.56	7.39	11.92	24.73	-12.81	22.73	22.82	-0.09
	vt99	22.20	25.28	-3.08	30.33	34.83	-4.50	27.15	27.43	-0.28	24.78	23.47	1.31	16.64	19.05	-2.41	10.54	20.91	-10.37	23.75	25.99	-2.24
	wi28	25.14	21.59	3.55	35.75	25.82	9.93	23.51	26.22	-2.71	22.24	21.78	0.46	30.31	18.49	11.82	17.26	17.35	-0.09	21.80	19.87	1.93
	wi36	18.66	19.31	-0.65	25.54	21.43	4.11	17.92	24.81	-6.89	20.73	19.41	1.32	18.45	16.61	1.84	13.72	15.76	-2.04	15.62	17.87	-2.25
	wi37	17.55	20.69	-3.14	22.64	23.48	-0.84	21.00	21.68	-0.68	20.25	23.01	-2.76	16.82	16.79	0.03	12.29	19.17	-6.88	12.29	20.03	-7.74
	wi99	25.00	26.28	-1.28	16.70	29.16	-12.46	27.32	30.28	-2.96	29.66	28.47	1.19	31.13	25.26	5.87	24.54	20.51	4.03	20.64	24.03	-3.39
	wv04	19.89	18.00	1.89	16.85	18.08	-1.23	24.24	23.59	0.65	17.83	19.72	-1.89	19.09	18.14	0.95	16.56	15.01	1.55	24.74	13.48	11.26
	wv18	27.82	26.53	1.29	35.39	27.24	8.15	36.39	28.45	7.94	25.57	31.57	-6.00	25.15	31.23	-6.08	13.34	23.69	-10.35	31.09	16.99	14.10

Table 6 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	11.10	10.62	0.48	10.48	8.10	2.38	10.30	11.15	-0.85	16.97	14.98	1.99	10.25	14.21	-3.96	9.60	8.72	0.88	8.97	6.57	2.40
	fl03	10.22	12.45	-2.23	7.99	9.47	-1.48	12.16	10.91	1.25	9.56	18.31	-8.75	11.80	18.57	-6.77	12.49	10.77	1.72	7.34	6.65	0.69
	fl11	10.38	8.24	2.14	9.91	7.36	2.55	14.44	10.28	4.16	6.95	7.23	-0.28	10.47	10.27	0.20	5.85	6.45	-0.60	14.65	7.85	6.80
	fl41	9.33	11.64	-2.31	6.71	6.73	-0.02	10.91	11.23	-0.32	7.97	12.10	-4.13	14.99	18.88	-3.89	6.41	11.64	-5.23	8.97	9.25	-0.28
	ga41	13.14	11.04	2.10	10.06	8.48	1.58	15.38	10.53	4.85	16.56	17.36	-0.80	16.67	12.74	3.93	8.24	9.85	-1.61	11.95	7.27	4.68
	ms10	13.30	11.17	2.13	14.98	7.41	7.57	11.46	11.96	-0.50	17.13	15.57	1.56	15.81	15.08	0.73	11.12	10.60	0.52	9.30	6.38	2.92
	ms30	13.59	10.25	3.34	13.90	9.94	3.96	11.32	9.54	1.78	21.35	12.42	8.93	14.12	13.15	0.97	14.00	10.09	3.91	6.86	6.36	0.50
	nc03	13.89	13.38	0.51	10.49	12.08	-1.59	15.53	13.24	2.29	17.20	17.87	-0.67	17.97	15.93	2.04	9.82	12.15	-2.33	12.31	8.98	3.33
	nc25	11.25	10.11	1.14	8.50	7.34	1.16	15.11	11.62	3.49	16.63	15.11	1.52	13.13	12.88	0.25	8.31	7.29	1.02	5.79	6.42	-0.63
	nc34	17.10	16.80	0.30	12.79	14.27	-1.48	25.62	16.51	9.11	20.78	22.72	-1.94	17.75	25.57	-7.82	13.34	11.02	2.32	12.31	10.73	1.58
	nc36	15.98	18.33	-2.35	14.46	17.97	-3.51	23.28	21.51	1.77	14.60	24.57	-9.97	16.56	19.84	-3.28	8.70	12.87	-4.17	18.26	13.21	5.05
	nc41	14.58	14.08	0.50	8.34	11.98	-3.64	17.66	13.41	4.25	20.85	18.11	2.74	13.50	18.80	-5.30	8.64	12.08	-3.44	18.47	10.08	8.39
	sc06	10.86	12.47	-1.61	11.75	10.26	1.49	10.12	11.11	-0.99	11.53	18.57	-7.04	12.75	16.08	-3.33	7.78	8.87	-1.09	11.22	9.95	1.27
	tn00	18.94	16.52	2.42	15.01	13.81	1.20	18.60	17.22	1.38	22.76	22.21	0.55	31.04	19.87	11.17	15.13	15.01	0.12	11.12	10.98	0.14
	tn11	13.58	13.57	0.01	13.46	10.17	3.29	13.13	12.97	0.16	16.67	18.39	-1.72	17.65	17.57	0.08	7.56	14.44	-6.88	12.99	7.87	5.12
West	ar02	14.45	12.85	1.60	13.19	10.89	2.30	11.47	12.76	-1.29	18.81	16.14	2.67	14.44	18.47	-4.03	24.62	10.93	13.69	4.18	7.92	-3.74
	ar03	16.74	13.45	3.29	15.75	11.90	3.85	15.36	13.07	2.29	17.53	18.14	-0.61	17.53	18.33	-0.80	21.05	10.72	10.33	13.24	8.57	4.67
	ar27	15.16	13.80	1.36	8.84	12.26	-3.42	14.59	14.40	0.19	19.62	15.45	4.17	16.62	20.63	-4.01	19.24	12.44	6.80	12.02	7.61	4.41
	az03	13.42	14.35	-0.93	4.27	6.91	-2.64	8.83	11.96	-3.13	20.58	24.32	-3.74	18.02	21.95	-3.93	12.96	11.79	1.17	15.88	9.19	6.69
	co00	11.75	9.28	2.47	6.90	5.14	1.76	8.18	8.37	-0.19	13.11	14.58	-1.47	14.70	13.78	0.92	18.60	8.73	9.87	9.03	5.08	3.95
	co02	19.17	16.83	2.34	8.26	10.83	-2.57	13.63	14.81	-1.18	41.15	22.50	18.65	24.59	24.14	0.45	18.27	14.98	3.29	9.13	13.71	-4.58
	co15	12.91	16.07	-3.16	5.64	14.91	-9.27	8.74	12.44	-3.70	13.70	17.94	-4.24	23.85	23.83	0.02	17.45	12.13	5.32	8.07	15.17	-7.10
	co19	17.32	18.90	-1.58	14.45	13.06	1.39	12.63	15.40	-2.77	14.42	20.72	-6.30	27.92	32.96	-5.04	22.86	19.56	3.30	11.64	11.72	-0.08
	co22	23.08	17.83	5.25	21.85	16.86	4.99	28.37	17.45	10.92	16.37	18.89	-2.52	35.79	21.03	14.76	18.28	18.02	0.26	17.81	14.73	3.08
	co97	11.79	14.04	-2.25	11.00	12.41	-1.41	10.13	14.77	-4.64	10.08	17.01	-6.93	15.98	17.76	-1.78	15.50	9.99	5.51	8.04	12.28	-4.24
	co98	10.04	11.02	-0.98	6.72	7.26	-0.54	7.77	10.01	-2.24	10.35	14.15	-3.80	14.43	16.77	-2.34	14.28	10.19	4.09	6.67	7.76	-1.09
	co99	17.39	15.56	1.83	8.28	11.63	-3.35	7.69	13.21	-5.52	21.48	20.00	1.48	19.95	23.63	-3.68	11.70	14.95	-3.25	35.24	9.96	25.28
	ia08	25.46	27.10	-1.64	13.97	31.42	-17.45	31.90	31.68	0.22	31.36	30.13	1.23	22.95	22.09	0.86	26.31	20.27	6.04	26.27	27.03	-0.76
	ia23	26.04	22.85	3.19	31.57	22.40	9.17	33.69	27.39	6.30	15.08	27.02	-11.94	21.13	20.89	0.24	26.15	17.15	9.00	28.61	22.29	6.32
	id03	15.96	13.55	2.41	14.26	7.45	6.81	6.58	11.40	-4.82	11.01	15.43	-4.42	30.10	25.88	4.22	29.25	13.21	16.04	4.57	7.94	-3.37
	id11	8.30	14.65	-6.35	7.74	7.20	0.54	4.96	10.12	-5.16	10.42	16.29	-5.87	17.81	34.85	-17.04	6.14	13.30	-7.16	2.74	6.12	-3.38
	ks31	27.08	22.25	4.83	39.79	25.09	14.70	18.27	24.51	-6.24	16.89	22.59	-5.70	16.88	22.46	-5.58	19.11	21.24	-2.13	51.57	17.62	33.95
	ks32	20.43	21.99	-1.56	18.99	20.15	-1.16	23.75	19.94	3.81	18.96	24.84	-5.88	31.52	27.98	3.54	17.59	22.20	-4.61	11.77	16.82	-5.05
	la12	13.66	11.21	2.45	11.71	7.83	3.88	14.41	12.50	1.91	16.55	13.31	3.24	22.52	16.28	6.24	11.46	10.40	1.06	5.30	6.92	-1.62
	la30	13.72	11.26	2.46	8.29	7.71	0.58	13.81	11.43	2.38	13.97	13.96	0.01	26.41	17.38	9.03	12.98	10.99	1.99	6.86	6.07	0.79
	mn16	15.78	16.20	-0.42	21.27	22.46	-1.19	16.48	16.73	-0.25	17.44	15.21	2.23	13.72	11.95	1.77	10.38	11.28	-0.90	15.39	19.55	-4.16
	mn23	19.82	20.18	-0.36	24.02	22.88	1.14	27.28	19.54	7.74	18.14	18.23	-0.09	20.64	16.88	3.76	8.45	15.32	-6.87	20.37	28.22	-7.85
	mo03	19.66	17.87	1.79	18.51	23.22	-4.71	19.79	19.44	0.35	15.05	17.90	-2.85	16.09	19.24	-3.15	28.85	16.15	12.70	19.70	11.26	8.44
	mt00	10.32	12.06	-1.74	7.78	10.98	-3.20	8.79	9.77	-0.98	8.71	12.80	-4.09	17.12	19.09	-1.97	12.10	9.47	2.63	7.43	10.23	-2.80
	mt05	5.26	6.45	-1.19	3.91	6.00	-2.09	6.82	5.91	0.91	4.51	6.93	-2.42	7.48	9.17	-1.69	5.39	5.91	-0.52	3.43	4.79	-1.36
	nd08	18.00	17.57	0.43	21.47	16.97	4.50	24.16	24.12	0.04	26.71	15.40	11.31	10.50	14.20	-3.70	12.82	13.65	-0.83	12.35	21.08	-8.73
	nm07	16.02	12.90	3.12	8.96	11.18	-2.22	17.32	13.15	4.17	14.83	18.37	-3.54	18.23	17.58	0.65	14.79	10.44	4.35	22.01	6.67	15.34
	nm08	16.69	10.80	5.89	12.63	8.25	4.38	23.37	11.02	12.35	16.48	14.53	1.95	15.64	14.77	0.87	10.29	10.67	-0.38	21.75	5.52	16.23
	nm09	16.80	12.57	4.23	11.16	9.46	1.70	12.53	9.32	3.21	15.19	19.13	-3.94	26.69	20.04	6.65	14.60	10.03	4.57	20.65	7.46	13.19
	ok00	20.91	19.18	1.73	17.20	24.35	-7.15	17.18	18.05	-0.87	22.40	17.28	5.12	12.33	23.23	-10.90	19.25	18.72	0.53	37.09	13.48	23.61
	ok17	17.14	15.46	1.68	21.40	13.49	7.91	16.33	15.97	0.36	17.54	18.26	-0.72	18.31	20.01	-1.70	17.44	13.74	3.70	11.83	11.26	0.57
	or09	6.38	8.99	-2.61	3.45	4.62	-1.17	3.28	9.10	-5.82	5.52	9.99	-4.47	19.17	15.81	3.36	5.10	11.33	-6.23	1.76	3.09	-1.33
	or10	3.05	4.11	-1.06	1.25	1.77	-0.52	2.89	3.34	-0.45	3.83	3.90	-0.07	6.38	10.03	-3.65	2.55	3.73	-1.18	1.40	1.90	-0.50
	or18	4.24	6.85	-2.61	3.28	3.71	-0.43	3.20	5.60	-2.40	7.04	6.90	0.14	6.01	14.74	-8.73	4.67	7.21	-2.54	1.26	2.93	-1.67
	or97	3.66	5.12	-1.46	1.79	3.40	-1.61	4.43	5.26	-0.83	3.96	5.00	-1.04	7.13	9.41	-2.28	2.32	5.14	-2.82	2.32	2.49	-0.17
	sd08	14.90	13.70	1.20	5.09	9.39	-4.30	21.60	15.51	6.09	14.25	13.96	0.29	21.60	16.85	4.75	13.66	13.96	-0.30	13.20	12.55	0.65
	sd99	19.79	17.41	2.38	19.28	19.33	-0.05	19.74	24.98	-5.24	15.06	17.54	-2.48	20.89	20.45	0.44	28.96	13.45	15.51	14.78	8.69	6.09

Table 6 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	16.71	14.52	2.19	25.81	14.93	10.88	13.96	17.12	-3.16	21.90	12.77	9.13	13.29	16.09	-2.80	14.70	12.41	2.29	10.60	13.82	-3.22
	tx10	12.49	13.47	-0.98	10.57	13.84	-3.27	11.75	15.46	-3.71	9.05	15.33	-6.28	17.54	17.42	0.12	15.55	11.51	4.04	10.46	7.25	3.21
	tx16	15.78	12.88	2.90	11.51	11.49	0.02	12.17	12.60	-0.43	15.02	14.97	0.05	18.92	16.23	2.69	18.31	8.65	9.66	18.75	13.36	5.39
	tx21	14.54	12.82	1.72	12.02	10.98	1.04	12.63	12.11	0.52	13.73	15.76	-2.03	18.16	18.91	-0.75	16.64	11.18	5.46	14.03	7.96	6.07
	tx56	18.35	14.99	3.36	17.73	15.96	1.77	15.29	21.32	-6.03	16.73	15.49	1.24	18.80	16.95	1.85	31.12	9.22	21.90	10.45	10.99	-0.54
	wa14	2.25	2.10	0.15	1.44	1.75	-0.31	1.44	2.25	-0.81	3.81	2.80	1.01	3.51	2.30	1.21	1.95	2.06	-0.11	1.38	1.47	-0.09
	wa21	6.52	6.75	-0.23	3.78	2.94	0.84	6.24	7.87	-1.63	14.07	9.04	5.03	9.10	11.02	-1.92	4.18	5.91	-1.73	1.73	3.74	-2.01
	wy02	8.01	9.57	-1.56	5.73	6.68	-0.95	9.68	8.13	1.55	6.49	8.34	-1.85	14.99	20.74	-5.75	8.77	7.34	1.43	2.38	6.16	-3.78
	wy08	7.93	10.05	-2.12	5.47	7.21	-1.74	6.04	8.13	-2.09	10.57	11.43	-0.86	12.96	17.60	-4.64	8.58	9.45	-0.87	3.98	6.46	-2.48
	wy99	18.15	13.95	4.20	17.42	12.84	4.58	19.02	14.62	4.40	14.45	15.24	-0.79	20.65	17.40	3.25	19.10	12.62	6.48	18.28	10.97	7.31

Table 7. Regional comparison of observed 1995 annual and bi-monthly ionic concentrations at NADP/NTN sites with values predicted by the seasonalized trend model using data from 1983 through 1994.

Region	Number of Valid 1995 Estimates	Frequency of observed 1995 concentrations that were less than predicted: Annual Mean n	Annual Mean %	January-February n	January-February %	March-April n	March-April %	May-June n	May-June %	July-August n	July-August %	September-October n	September-October %	November-December n	November-December %
								Hydrogen Ion							
East	62	55	88.7	45	72.6	28	45.2	46	74.2	41	66.1	53	85.5	44	71.0
NE	47	43	91.5	36	76.6	24	51.1	35	74.5	28	59.6	42	89.4	37	78.7
SE	15	12	80.0	9	60.0	4	26.7	11	73.3	13	86.7	11	73.3	7	46.7
West	47	15	31.9	29	61.7	24	51.1	22	46.8	18	38.3	19	40.4	28	59.6
Total	109	70	64.2	74	67.9	52	47.7	68	62.4	59	54.1	72	66.1	72	66.1
								Sulfate							
East	62	49	79.0	40	64.5	30	48.4	45	72.6	41	66.1	47	75.8	43	69.4
NE	47	39	83.0	32	68.1	24	51.1	34	72.3	30	63.8	39	83.0	36	76.6
SE	15	10	66.7	8	53.3	6	40.0	11	73.3	11	73.3	8	53.3	7	46.7
West	47	17	36.2	28	59.6	30	63.8	22	46.8	20	42.6	15	31.9	25	53.2
Total	109	66	60.6	68	62.4	60	55.0	67	61.5	61	56.0	62	56.9	68	62.4
								Nitrate							
East	62	24	38.7	36	58.1	20	32.3	33	53.2	22	35.5	43	69.4	17	27.4
NE	47	20	42.6	30	63.8	16	34.0	24	51.1	15	31.9	35	74.5	15	31.9
SE	15	4	26.7	6	40.0	4	26.7	9	60.0	7	46.7	8	53.3	2	13.3
West	47	20	42.6	25	53.2	27	57.4	29	61.7	24	51.1	17	36.2	26	55.3
Total	109	44	40.4	61	56.0	47	43.1	62	56.9	46	42.2	60	55.0	43	39.4
								Chloride							
East	62	14	22.6	22	35.5	27	43.5	27	43.5	24	38.7	22	35.5	25	40.3
NE	47	10	21.3	19	40.4	20	42.6	21	44.7	21	44.7	17	36.2	17	36.2
SE	15	4	26.7	3	20.0	7	46.7	6	40.0	3	20.0	5	33.3	8	53.3
West	47	16	34.0	26	55.3	22	46.8	22	46.8	13	27.7	15	31.9	27	57.4
Total	109	30	27.5	48	44.0	49	45.0	49	45.0	37	33.9	37	33.9	52	47.7
								Ammonium							
East	62	17	27.4	20	32.3	20	32.3	29	46.8	21	33.9	33	53.2	18	29.0
NE	47	13	27.7	16	34.0	16	34.0	24	51.1	19	40.4	25	53.2	16	34.0
SE	15	4	26.7	4	26.7	4	26.7	5	33.3	2	13.3	8	53.3	2	13.3
West	47	17	36.2	26	55.3	30	63.8	26	55.3	21	44.7	15	31.9	22	46.8
Total	109	34	31.2	46	42.2	50	45.9	55	50.5	42	38.5	48	44.0	40	36.7
								Calcium							
East	62	4	6.5	25	40.3	15	24.2	20	32.3	20	32.3	22	35.5	7	11.3
NE	47	2	4.3	24	51.1	10	21.3	14	29.8	12	25.5	18	38.3	6	12.8
SE	15	2	13.3	1	6.7	5	33.3	6	40.0	8	53.3	4	26.7	1	6.7
West	47	11	23.4	23	48.9	20	42.6	22	46.8	11	23.4	13	27.7	18	38.3
Total	109	15	13.8	48	44.0	35	32.1	42	38.5	31	28.4	35	32.1	25	22.9
								Magnesium							
East	62	3	4.8	21	33.9	13	21.0	16	25.8	9	14.5	10	16.1	15	24.2
NE	47	1	2.1	19	40.4	10	21.3	10	21.3	6	12.8	8	17.0	8	17.0
SE	15	2	13.3	2	13.3	3	20.0	6	40.0	3	20.0	2	13.3	7	46.7
West	47	7	14.9	24	51.1	11	23.4	14	29.8	9	19.1	12	25.5	18	38.3
Total	109	10	9.2	45	41.3	24	22.0	30	27.5	18	16.5	22	20.2	33	30.3
								Potassium							
East	62	6	9.7	16	25.8	15	24.2	16	25.8	23	37.1	20	32.3	19	30.6
NE	47	4	8.5	14	29.8	11	23.4	9	19.1	18	38.3	13	27.7	10	21.3
SE	15	2	13.3	2	13.3	4	26.7	7	46.7	5	33.3	7	46.7	9	60.0
West	47	11	23.4	21	44.7	20	42.6	25	53.2	13	27.7	18	38.3	18	38.3
Total	109	17	15.6	37	33.9	35	32.1	41	37.6	36	33.0	38	34.9	37	33.9
								Sodium							
East	62	5	8.1	21	33.9	20	32.3	12	19.4	9	14.5	6	9.7	16	25.8
NE	47	1	2.1	17	36.2	13	27.7	6	12.8	7	14.9	3	6.4	9	19.1
SE	15	4	26.7	4	26.7	7	46.7	6	40.0	2	13.3	3	20.0	7	46.7
West	47	5	10.6	28	59.6	18	38.3	12	25.5	3	6.4	10	21.3	18	38.3
Total	109	10	9.2	49	45.0	38	34.9	24	22.0	12	11.0	16	14.7	34	31.2

Table 8. Regional mean departures of 1995 annual and bi-monthly ionic concentrations at NADP/NTN sites with values predicted by the seasonalized trend model using data from 1983 through 1994.

Region	Number of Valid 1995 Estimates	Annual Mean µeq/L	Annual Mean %	January-February µeq/L	January-February %	March-April µeq/L	March-April %	May-June µeq/L	May-June %	July-August µeq/L	July-August %	September-October µeq/L	September-October %	November-December µeq/L	November-December %
								Hydrogen Ion							
East	62	-4.95	-11.7	-5.09	-13.0	0.59	4.3	-7.91	-12.5	-2.66	-3.7	-10.98	-30.2	-3.65	-10.6
NE	47	-5.53	-12.4	-5.92	-15.3	0.23	2.3	-8.05	-10.7	-1.74	-0.3	-12.81	-33.0	-4.91	-15.9
SE	15	-3.13	-9.4	-2.49	-5.7	1.71	10.7	-7.46	-18.0	-5.56	-14.4	-5.27	-21.5	0.28	5.9
West	47	0.76	10.7	-0.67	-1.8	0.19	10.6	-0.03	18.1	1.54	15.9	3.30	31.3	0.24	3.8
Total	109	-2.49	-2.0	-3.18	-8.2	0.42	7.0	-4.51	0.7	-0.85	4.8	-4.82	-3.7	-1.97	-4.4
								Sulfate							
East	62	-4.01	-9.8	-3.12	-8.9	1.17	3.1	-7.47	-12.7	-4.14	-6.1	-8.06	-21.4	-2.45	-9.8
NE	47	-4.70	-11.3	-3.99	-12.3	0.99	2.4	-8.04	-13.1	-4.10	-4.7	-9.59	-24.9	-3.49	-14.8
SE	15	-1.85	-5.2	-0.38	1.5	1.72	5.3	-5.68	-11.6	-4.27	-10.3	-3.26	-10.2	0.79	6.0
West	47	1.37	7.5	-0.76	-5.4	-0.91	-6.2	1.71	8.9	1.29	9.4	4.98	31.1	1.92	17.2
Total	109	-1.69	-2.3	-2.10	-7.4	0.27	-0.9	-3.51	-3.4	-1.80	0.6	-2.44	1.3	-0.57	1.9
								Nitrate							
East	62	0.97	4.6	-0.04	2.7	3.31	15.4	0.13	0.9	3.20	13.5	-2.82	-14.9	2.04	17.7
NE	47	1.14	4.5	-0.34	-0.8	3.69	15.1	0.56	2.6	4.53	19.2	-3.40	-17.4	1.80	12.9
SE	15	0.44	4.9	0.90	13.8	2.12	16.3	-1.20	-4.5	-1.00	-4.3	-0.99	-7.0	2.80	32.7
West	47	0.76	3.8	0.26	1.3	-0.12	-3.1	-0.68	-3.2	-0.64	-2.1	3.20	27.1	2.54	26.2
Total	109	0.88	4.3	0.09	2.1	1.83	7.4	-0.22	-0.9	1.54	6.8	-0.22	3.2	2.26	21.4
								Chloride							
East	62	0.93	21.1	2.66	53.2	0.32	5.7	0.41	7.9	0.38	16.8	0.99	21.1	0.79	24.3
NE	47	0.97	23.6	2.44	55.2	0.36	6.4	0.41	8.2	0.34	15.1	0.97	23.1	1.32	32.2
SE	15	0.77	13.2	3.36	47.0	0.18	3.2	0.44	7.1	0.52	22.3	1.02	14.7	-0.88	-0.6
West	47	0.67	12.4	0.63	4.0	0.90	12.3	1.62	21.4	0.89	23.9	0.43	19.1	-0.45	14.7
Total	109	0.81	17.3	1.78	32.0	0.57	8.5	0.94	13.7	0.60	19.9	0.75	20.2	0.25	20.1
								Ammonium							
East	62	1.69	14.3	1.62	23.0	2.71	25.3	1.46	10.8	2.61	20.0	0.06	0.1	1.67	26.6
NE	47	1.71	12.6	1.81	23.0	2.80	26.7	0.96	6.1	3.05	18.2	-0.07	-2.7	1.69	24.3
SE	15	1.63	19.6	1.03	23.1	2.41	20.9	3.03	25.6	1.22	25.7	0.47	8.9	1.59	33.9
West	47	0.62	8.3	-0.41	2.1	-2.42	-8.2	0.29	8.5	1.17	14.8	3.17	34.2	1.94	41.7
Total	109	1.23	11.7	0.75	14.0	0.50	10.8	0.96	9.8	1.99	17.8	1.40	14.8	1.79	33.1
								Calcium							
East	62	1.44	30.6	0.88	26.1	1.84	36.6	1.31	26.8	1.42	29.6	1.47	24.1	1.69	66.4
NE	47	1.66	31.4	0.86	20.2	2.20	41.9	1.50	26.3	1.78	33.8	1.72	20.8	1.91	68.8
SE	15	0.73	27.9	0.94	44.9	0.71	20.2	0.74	28.1	0.29	16.6	0.68	34.3	1.02	58.9
West	47	2.33	30.3	1.39	19.4	1.64	18.8	2.74	34.2	1.70	24.0	3.34	63.0	3.15	74.6
Total	109	1.82	30.4	1.10	23.2	1.76	28.9	1.93	30.0	1.54	27.2	2.27	40.8	2.32	69.9
								Magnesium							
East	62	0.64	47.9	0.65	65.5	0.71	45.6	0.54	34.4	0.59	49.4	0.84	56.1	0.49	56.0
NE	47	0.72	53.5	0.63	68.5	0.81	53.3	0.63	36.5	0.68	50.4	0.94	64.2	0.62	67.6
SE	15	0.38	30.5	0.72	56.1	0.36	21.4	0.28	27.7	0.31	46.0	0.50	30.9	0.10	19.8
West	47	0.53	37.1	0.25	13.2	0.39	26.9	0.82	38.7	0.69	48.6	0.64	64.5	0.38	78.5
Total	109	0.59	43.3	0.48	42.9	0.57	37.5	0.67	36.2	0.63	49.1	0.75	59.7	0.44	65.7
								Potassium							
East	62	0.26	64.8	0.14	64.8	0.17	41.7	0.31	58.5	0.18	50.7	0.60	115.8	0.17	79.6
NE	47	0.24	69.5	0.14	70.6	0.17	46.5	0.29	53.2	0.15	52.5	0.45	120.3	0.21	98.8
SE	15	0.34	50.1	0.11	46.7	0.15	26.8	0.39	75.4	0.26	45.2	1.06	101.8	0.03	19.4
West	47	0.23	51.5	0.05	21.7	0.29	77.8	0.17	25.6	0.43	88.9	0.22	48.5	0.22	119.9
Total	109	0.25	59.1	0.10	46.2	0.22	57.3	0.25	44.3	0.28	67.2	0.43	86.8	0.19	97.0
								Sodium							
East	62	1.49	48.7	3.30	87.9	0.71	20.7	1.02	46.9	0.94	59.2	1.64	51.4	1.36	46.6
NE	47	1.50	56.5	2.95	96.7	0.75	25.2	1.07	56.6	0.83	61.2	1.61	57.8	1.81	59.0
SE	15	1.46	24.1	4.40	60.3	0.58	6.9	0.85	16.7	1.31	53.1	1.72	31.2	-0.07	7.7
West	47	1.10	31.6	0.89	20.1	1.08	19.0	1.85	37.3	1.42	51.6	1.16	53.6	0.17	47.6
Total	109	1.32	41.3	2.26	58.7	0.87	20.0	1.38	42.8	1.15	55.9	1.43	52.3	0.85	47.0

Figure 1

National Atmospheric Deposition Program / National Trends Network

Trends in Sulfate Ion Concentration
1983 through 1994

▽ Negative slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

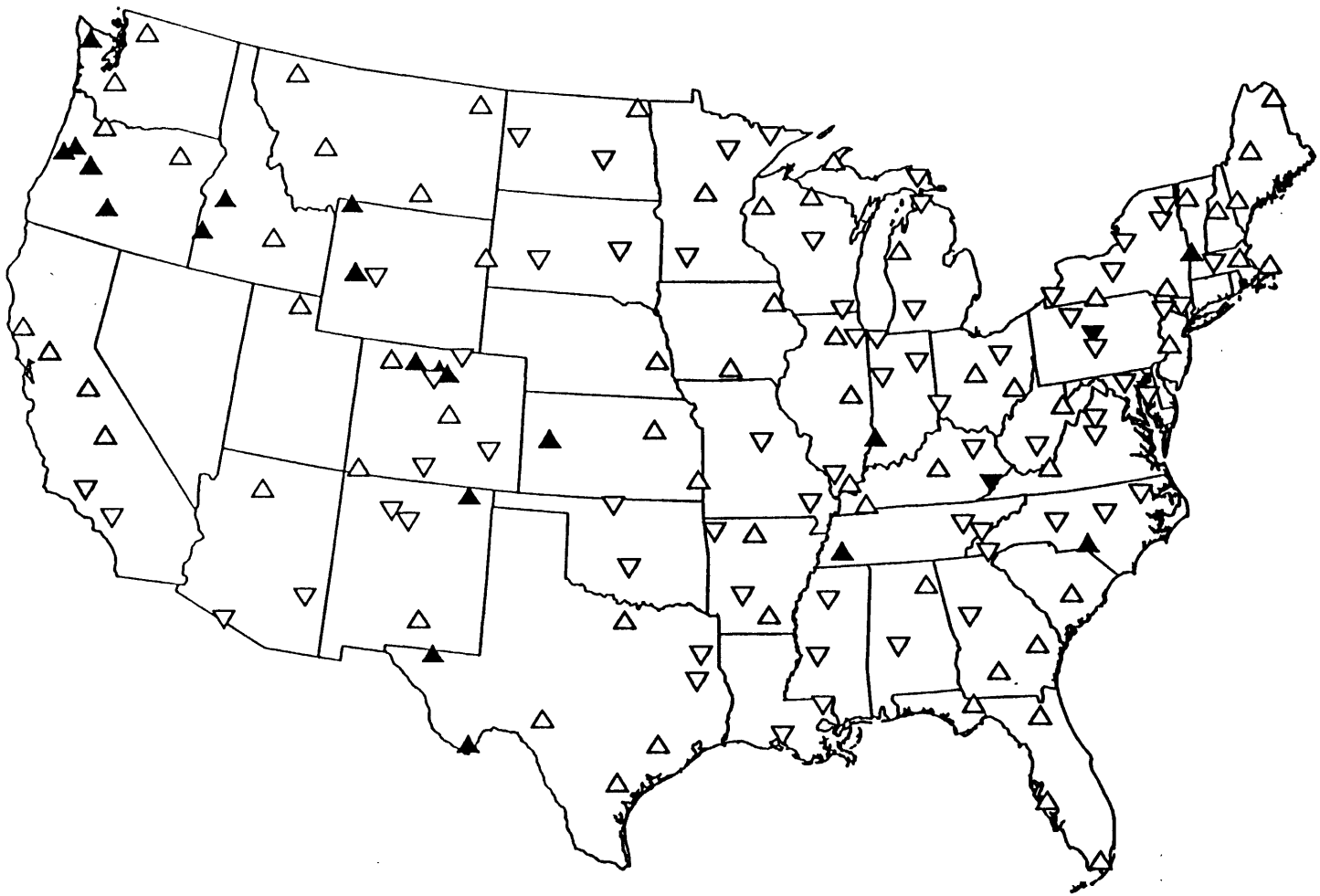
△ Positive slope estimate, p>0.05

▲ Positive slope estimate, p<0.05

Figure 2

National Atmospheric Deposition Program / National Trends Network

Trends in Nitrate Ion Concentration
1983 through 1994



▽ Negative slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

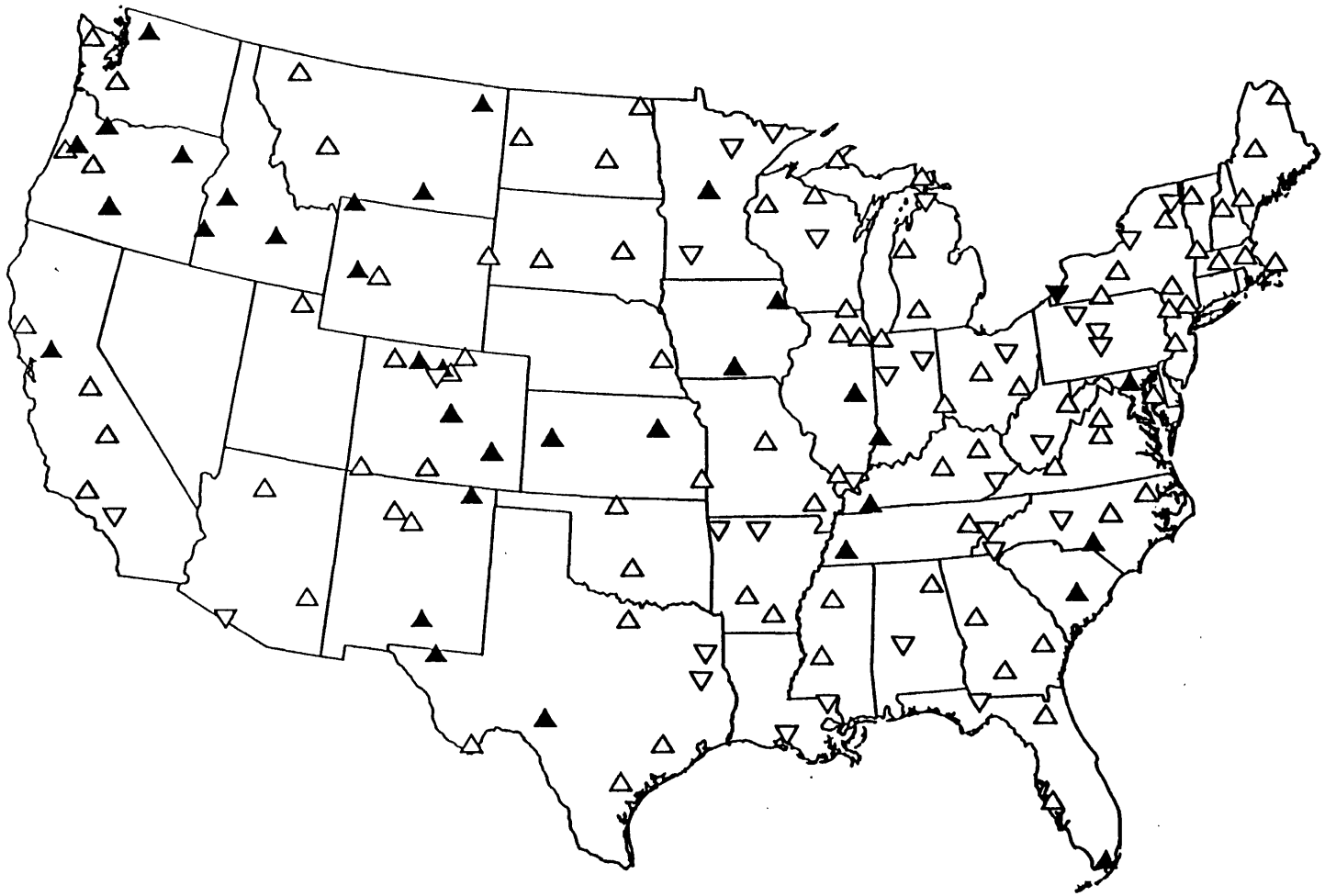
△ Positive slope estimate, p>0.05

▲ Positive slope estimate, p<0.05

Figure 3

National Atmospheric Deposition Program / National Trends Network

Trends in Ammonium Ion Concentration
1983 through 1994



▽ Negative slope estimate, p>0.05

△ Positive slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

▲ Positive slope estimate, p<0.05

Figure 4

National Atmospheric Deposition Program / National Trends Network

Trends in Calcium Ion Concentration
1983 through 1994

▽ Negative slope estimate, p>0.05

△ Positive slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

▲ Positive slope estimate, p<0.05

Figure 5

National Atmospheric Deposition Program / National Trends Network

Trends in Magnesium Ion Concentration
1983 through 1994

▽ Negative slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

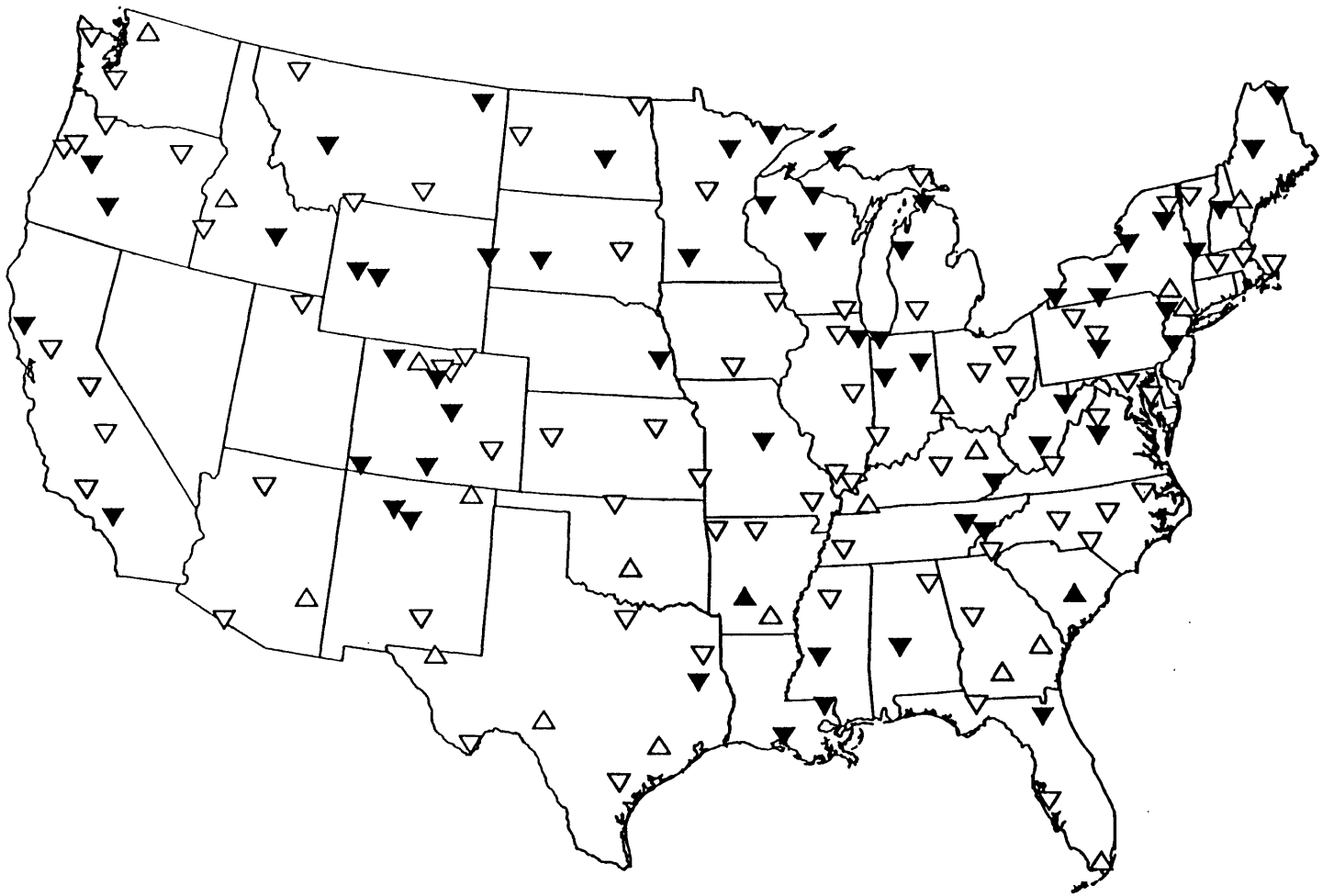
△ Positive slope estimate, p>0.05

▲ Positive slope estimate, p<0.05

Figure 6

National Atmospheric Deposition Program / National Trends Network

Trends in Potassium Ion Concentration
1983 through 1994



▽ Negative slope estimate, p>0.05

△ Positive slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

▲ Positive slope estimate, p<0.05

Figure 7

National Atmospheric Deposition Program / National Trends Network

Trends in Sodium Ion Concentration
1983 through 1994

▽ Negative slope estimate, p>0.05

△ Positive slope estimate, p>0.05

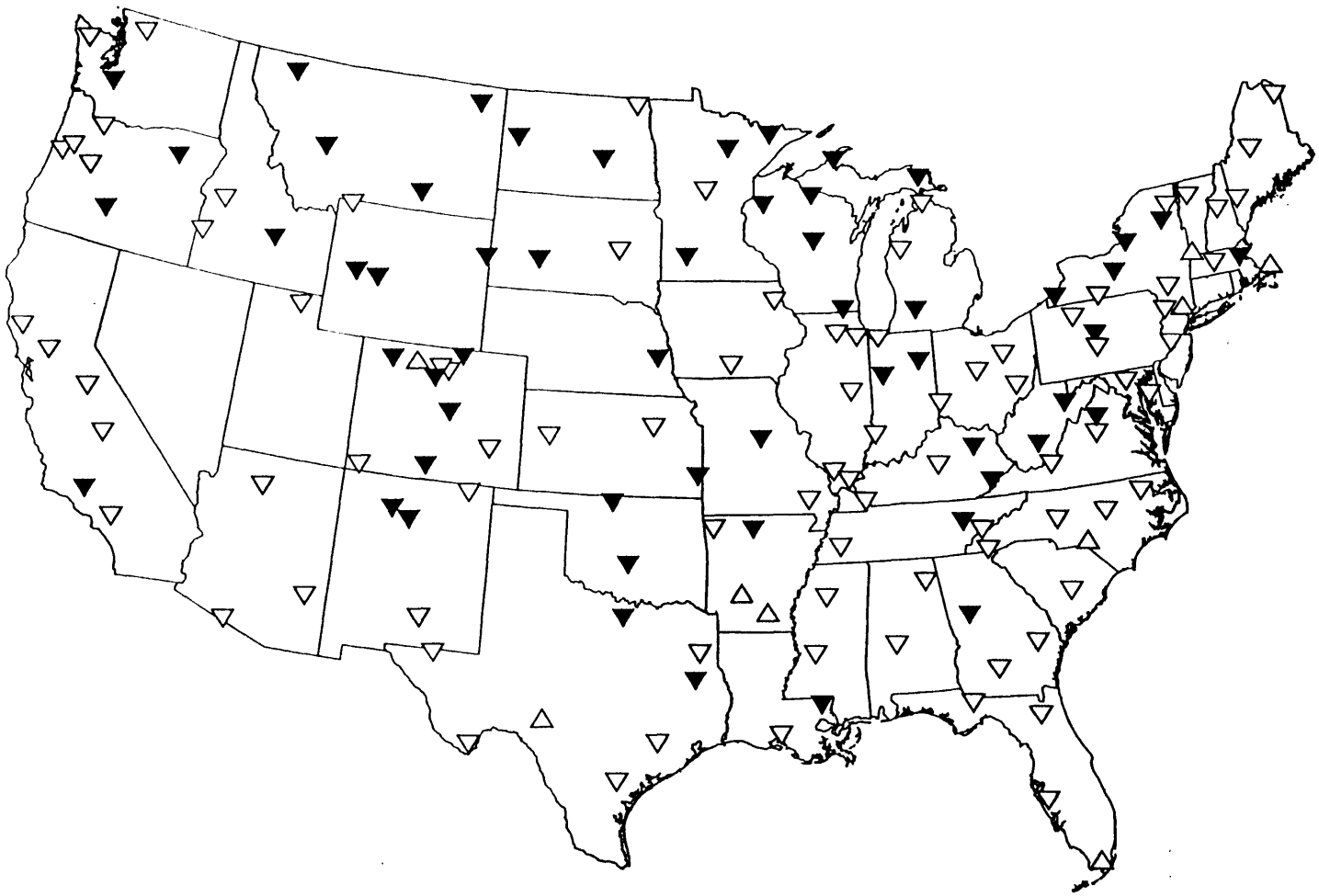
▼ Negative slope estimate, p<0.05

▲ Positive slope estimate, p<0.05

Figure 8

National Atmospheric Deposition Program / National Trends Network

Trends in Chloride Ion Concentration
1983 through 1994



▽ Negative slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

△ Positive slope estimate, p>0.05

▲ Positive slope estimate, p<0.05

Figure 9

National Atmospheric Deposition Program / National Trends Network

Trends in Hydrogen Ion Concentration
1983 through 1994

▽ Negative slope estimate, p>0.05

▼ Negative slope estimate, p<0.05

△ Positive slope estimate, p>0.05

▲ Positive slope estimate, p<0.05

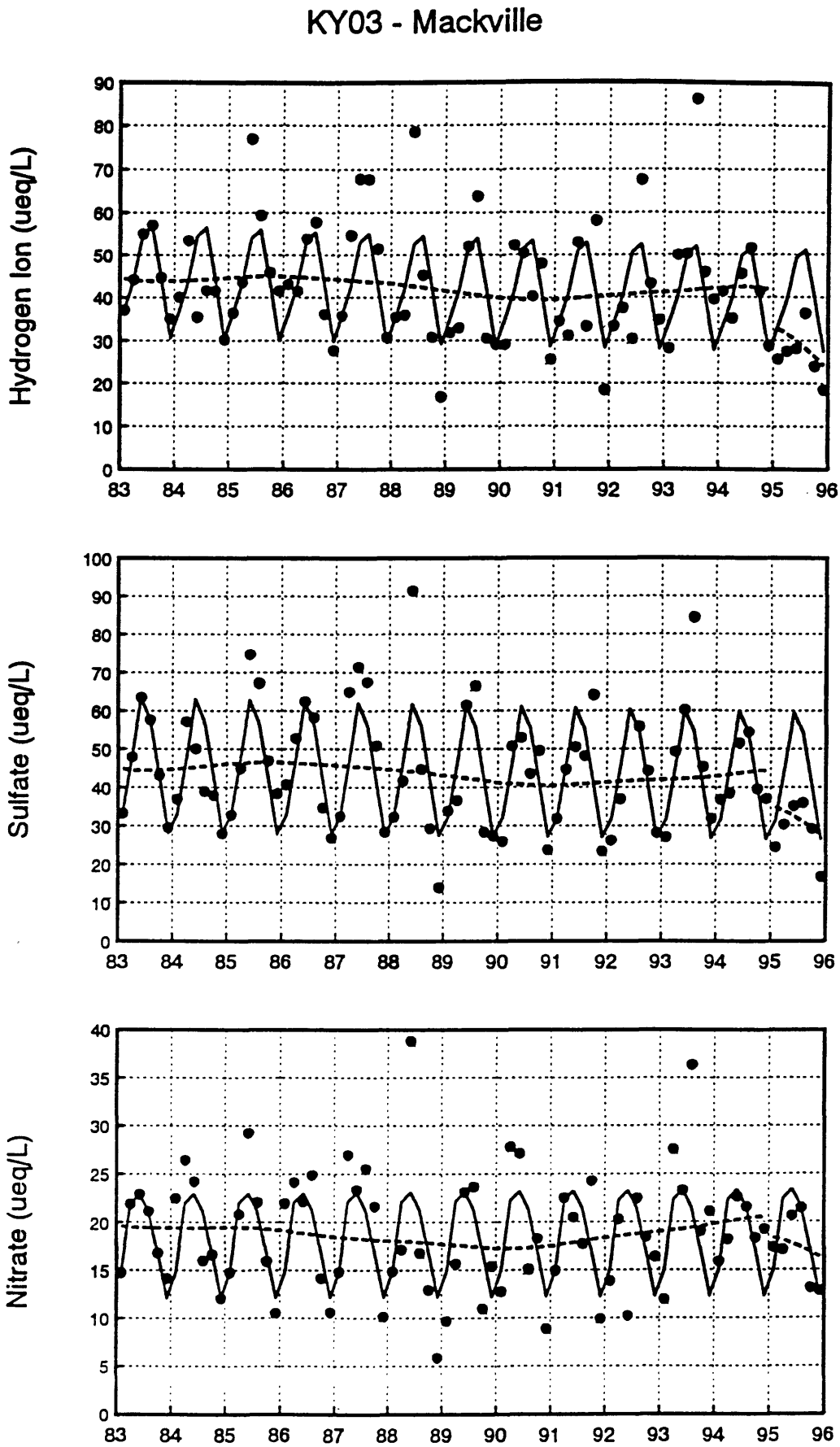


Figure 10. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for H^+, SO_4^{2-} and NO_3^- at Mackville, KY.

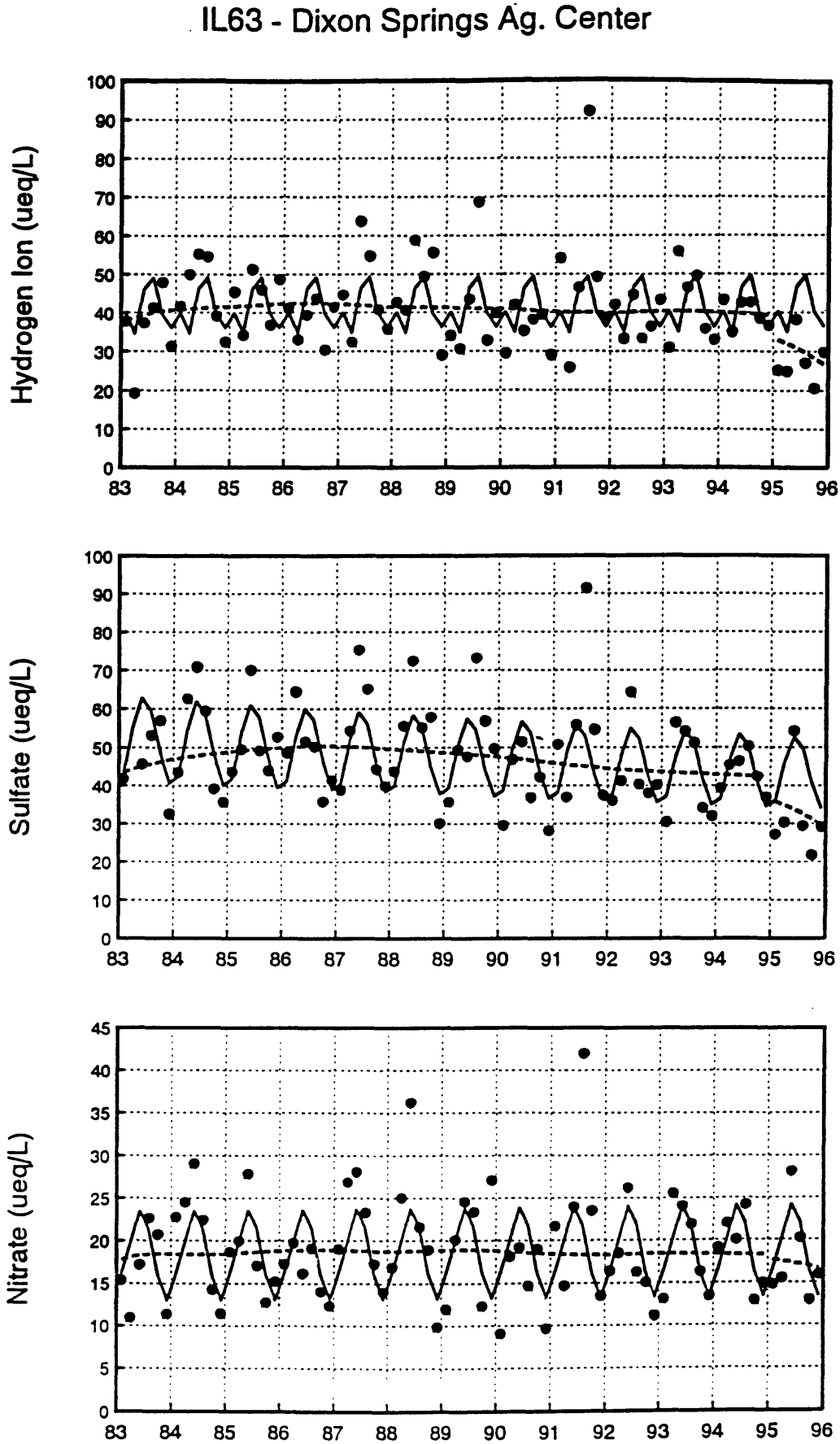


Figure 11. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for H^+, SO_4^{2-} and NO_3^- at Dixon Springs Agricultural Center, IL.

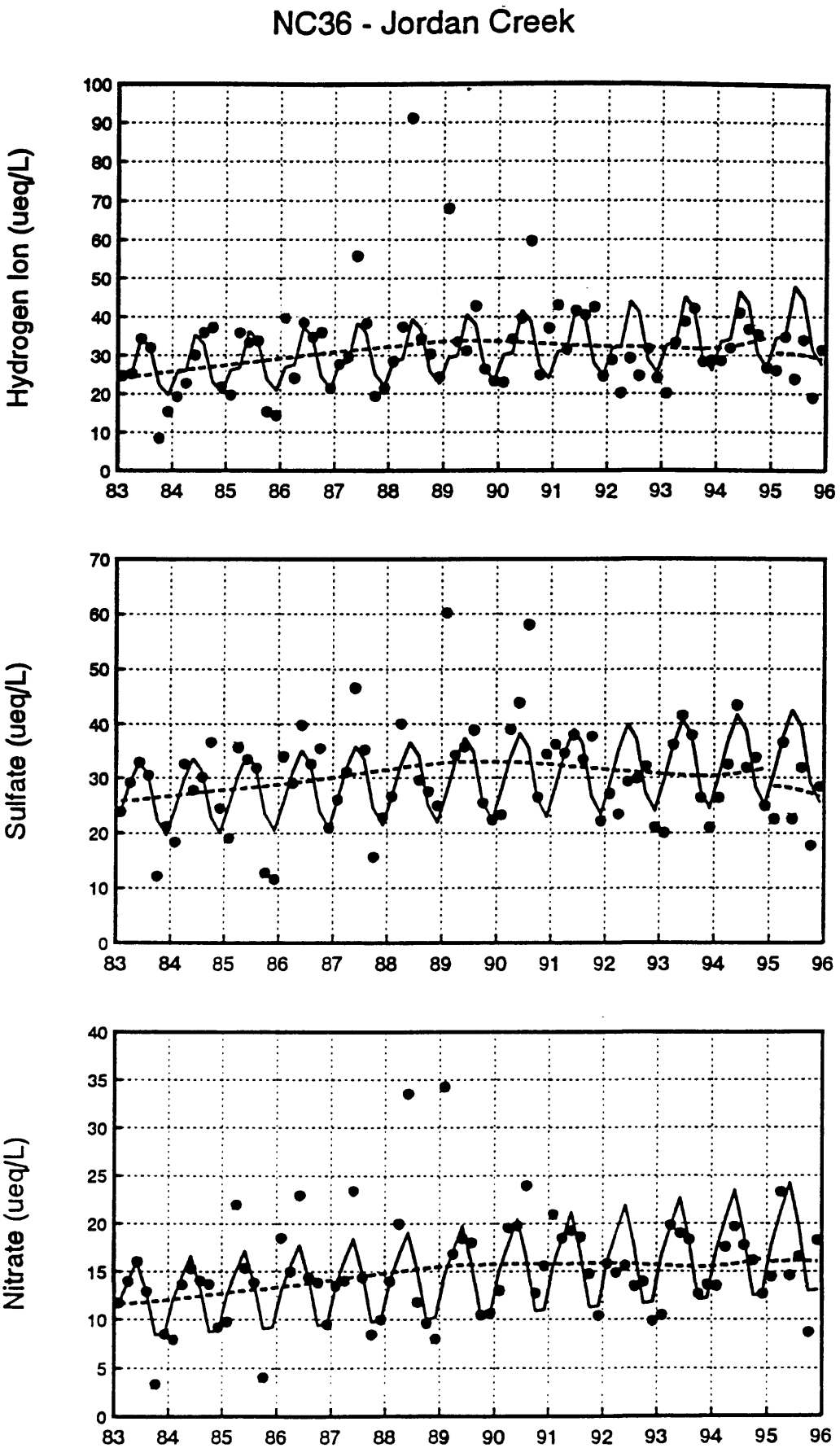


Figure 12. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for H^+, SO_4^{2-} and NO_3^- at Jordan Creek, NC.

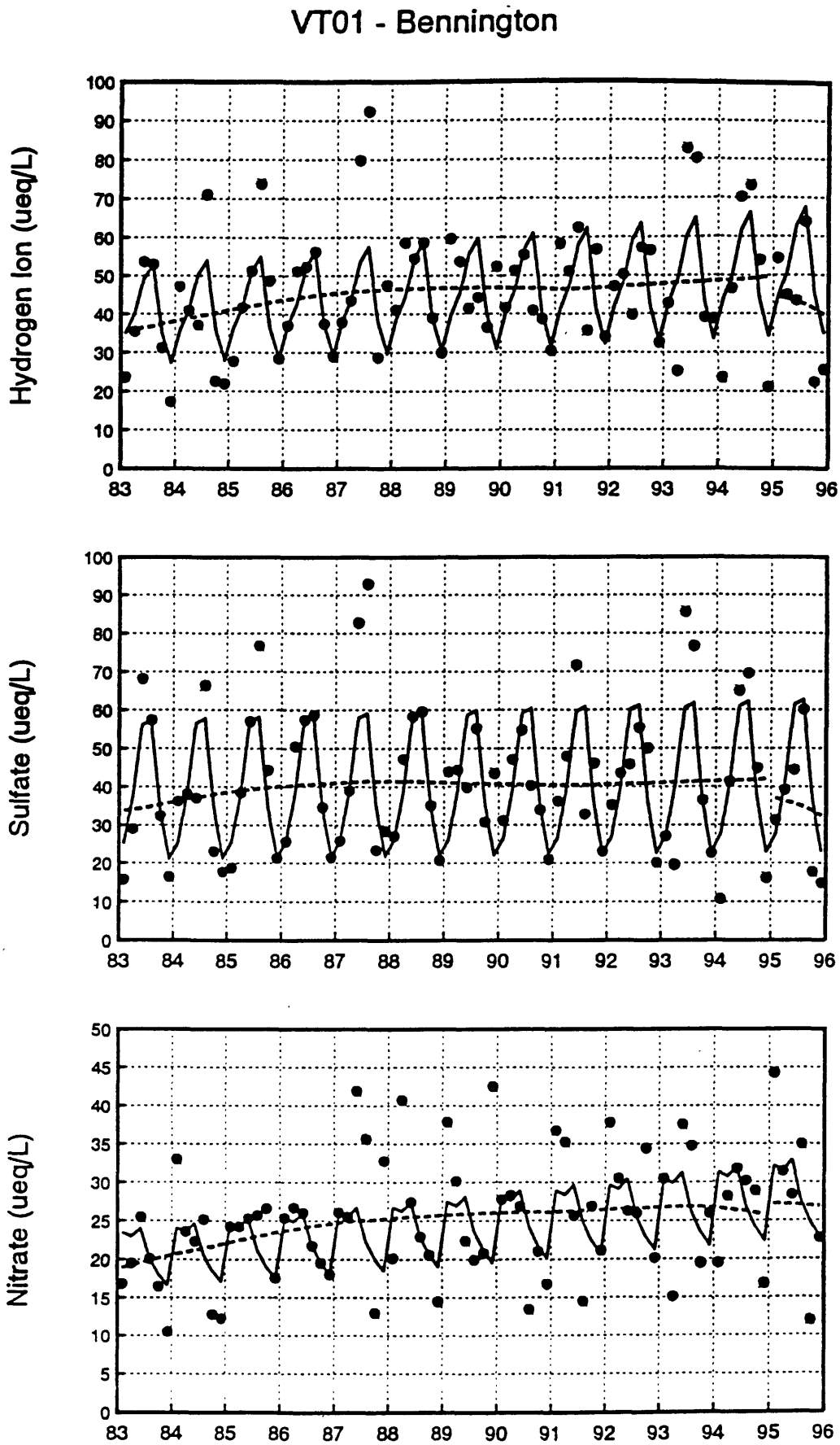


Figure 13. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for H^+, SO_4^{2-} and NO_3^- at Bennington, VT.

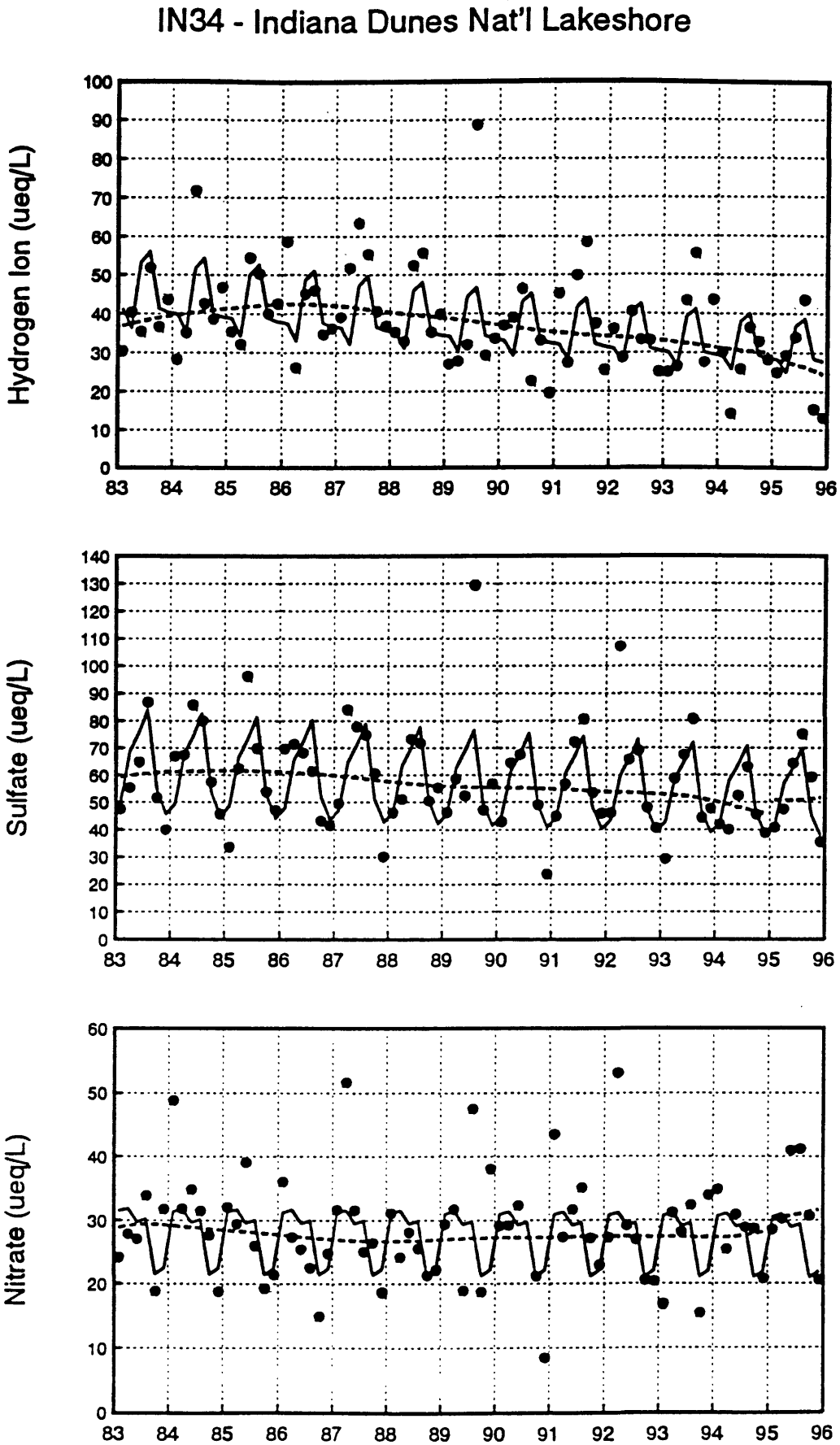


Figure 14. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for H^+, SO_4^{2-} and NO_3^- at Indiana Dunes Nat'l Lakeshore, IN.

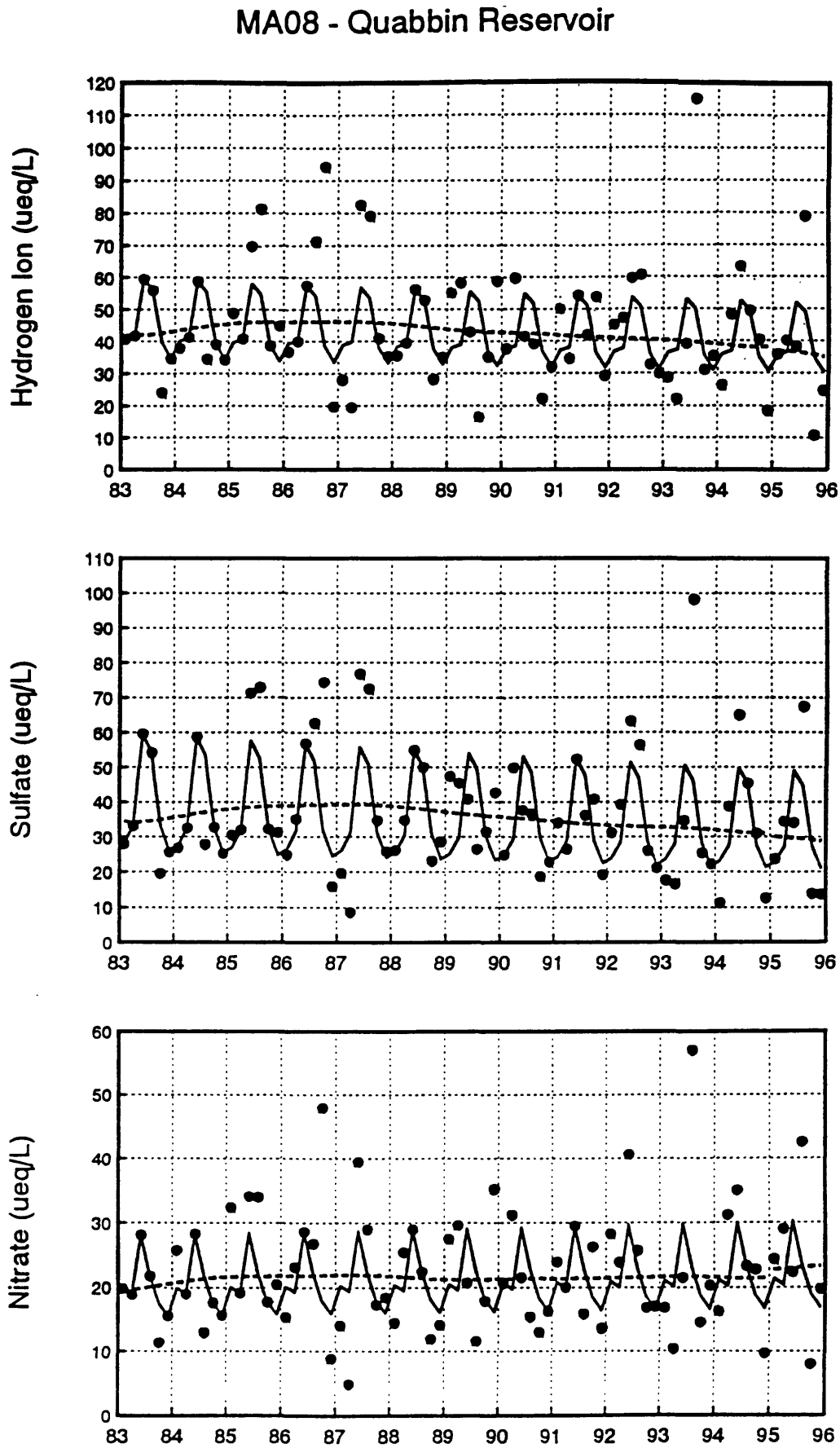
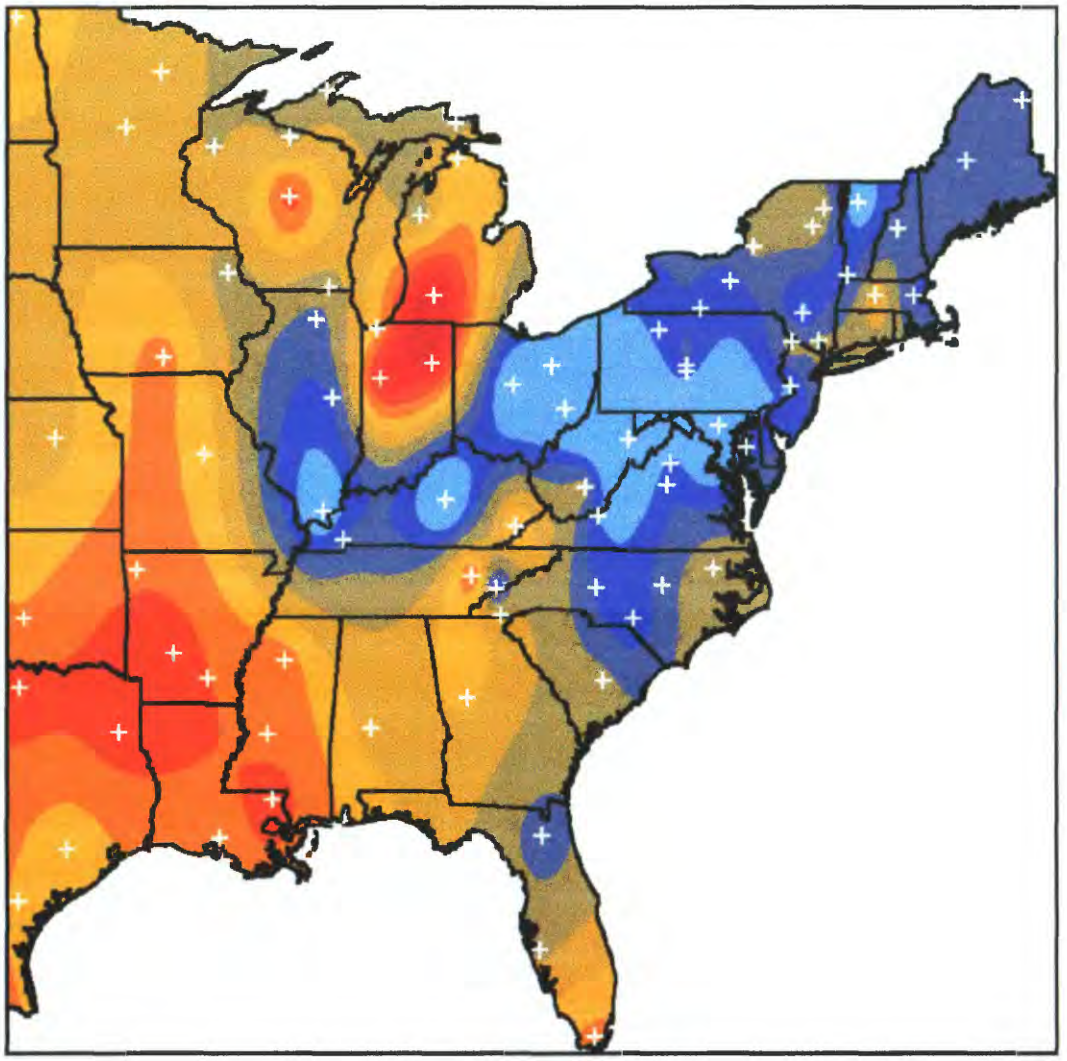


Figure 15. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for H^+, SO_4^{2-} and NO_3^- at Quabbin Reservoir, MA.

Figure 16

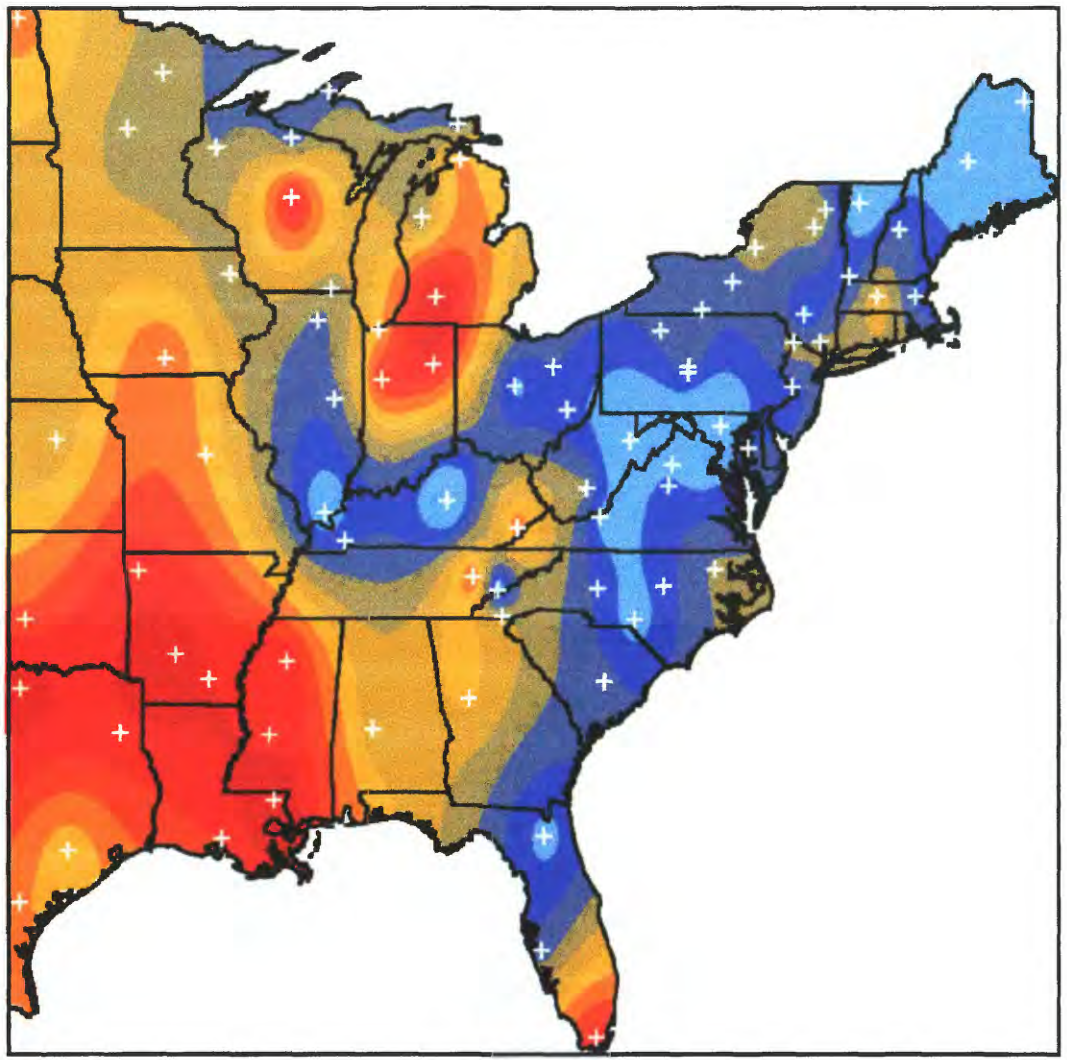
Departures of 1995 Annual Sulfate Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



Sulfate (ueq/L)

Figure 17

Percent Departures of 1995 Annual Sulfate Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



Percent

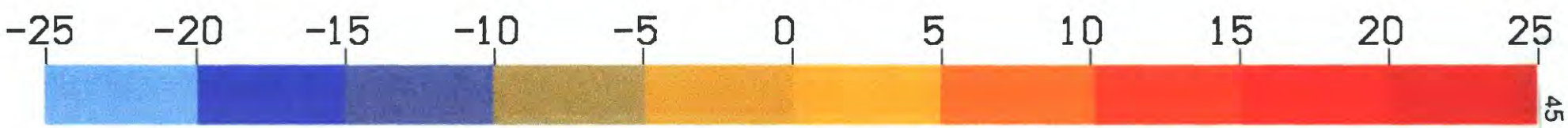
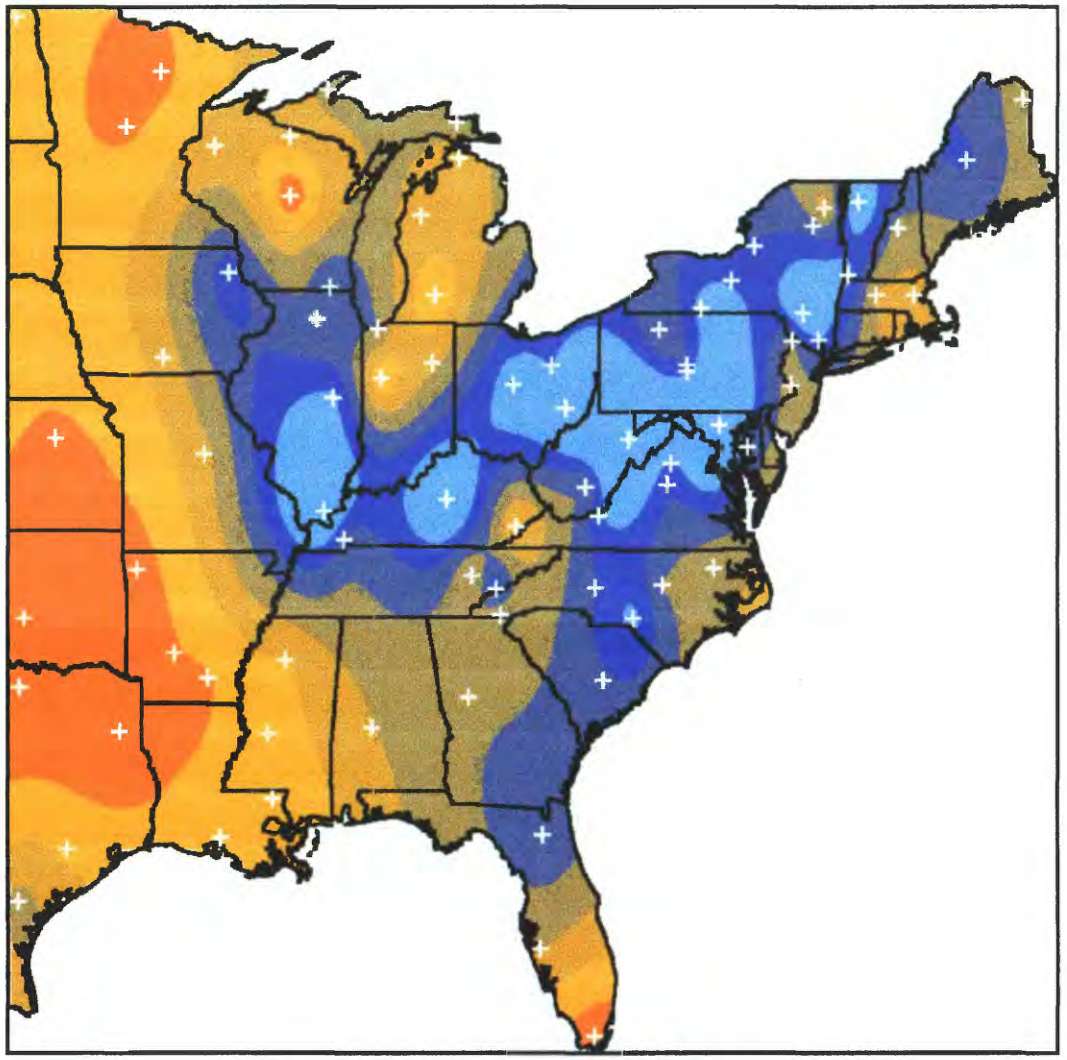


Figure 18

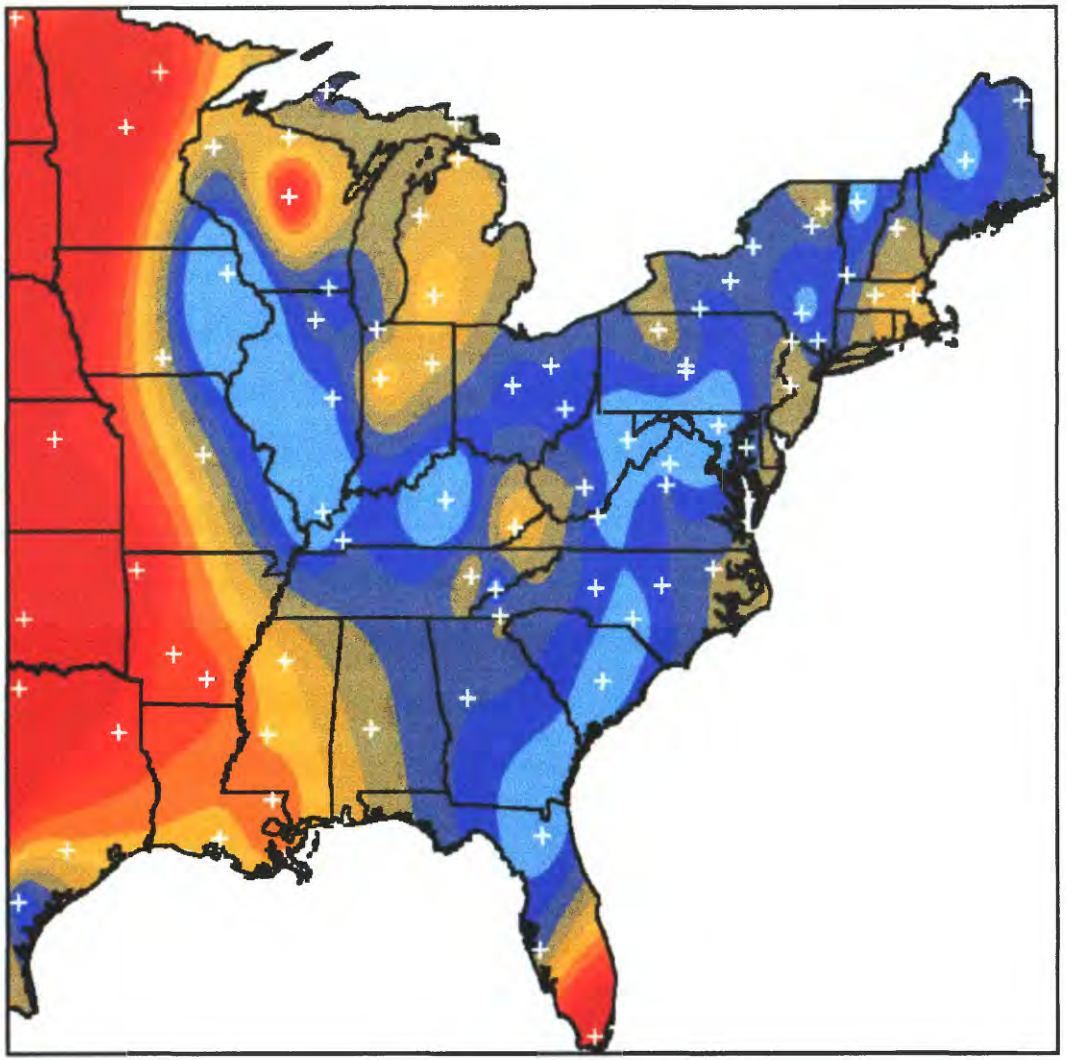
Departures of 1995 Annual Hydrogen Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



Hydrogen Ion (ueq/L)

Figure 19

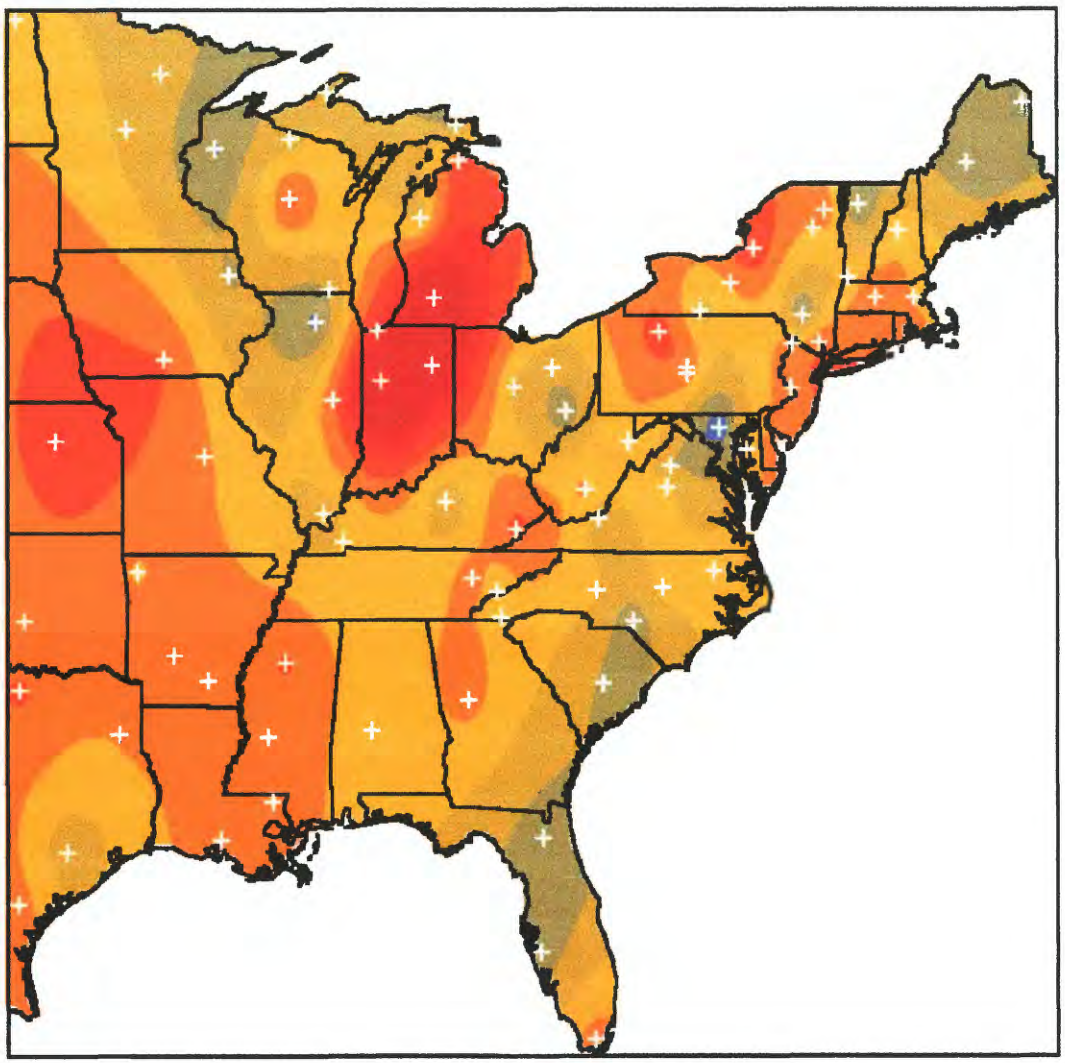
Percent Departures of 1995 Annual Hydrogen Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



Percent

Figure 20

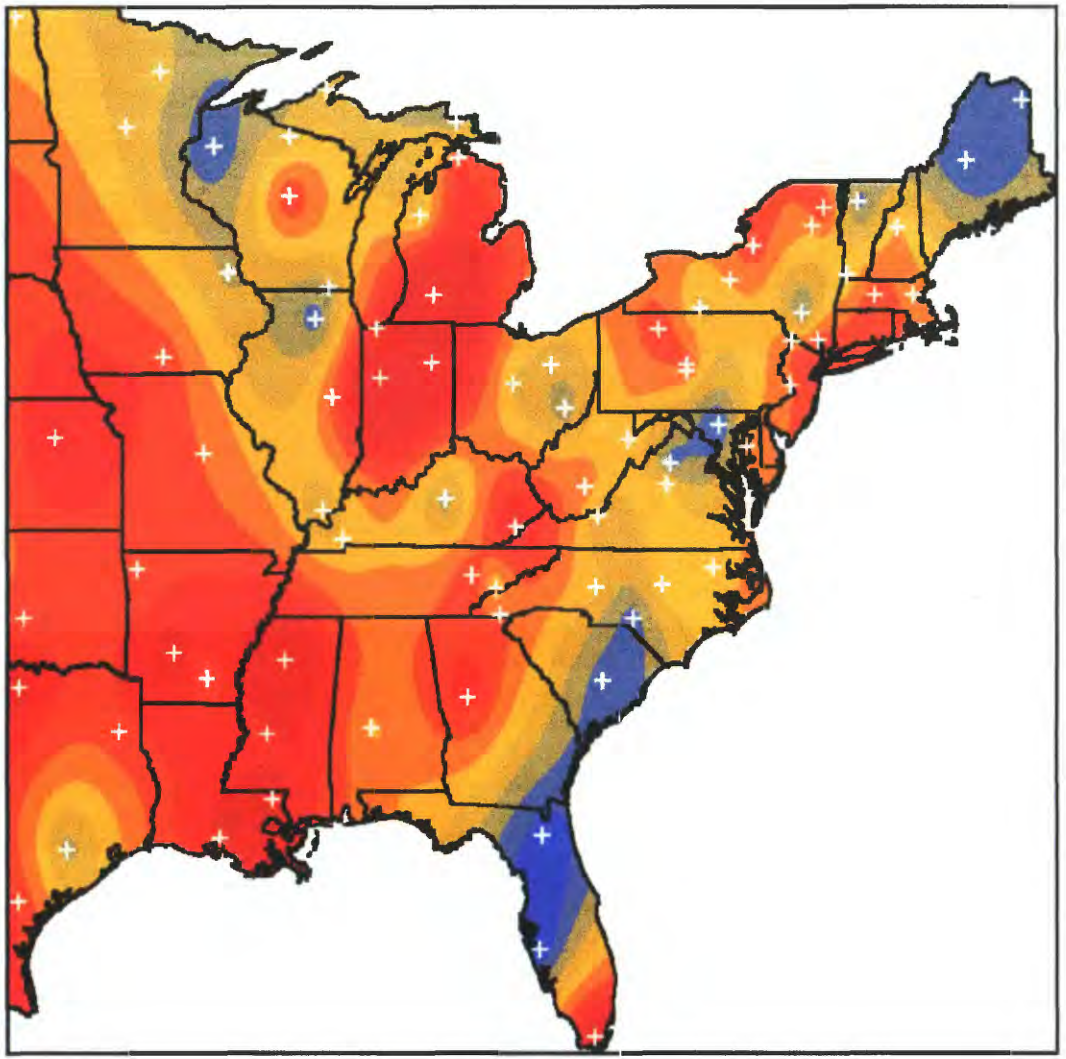
Departures of 1995 Annual Nitrate Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



Nitrate (ueq/L)

Figure 21

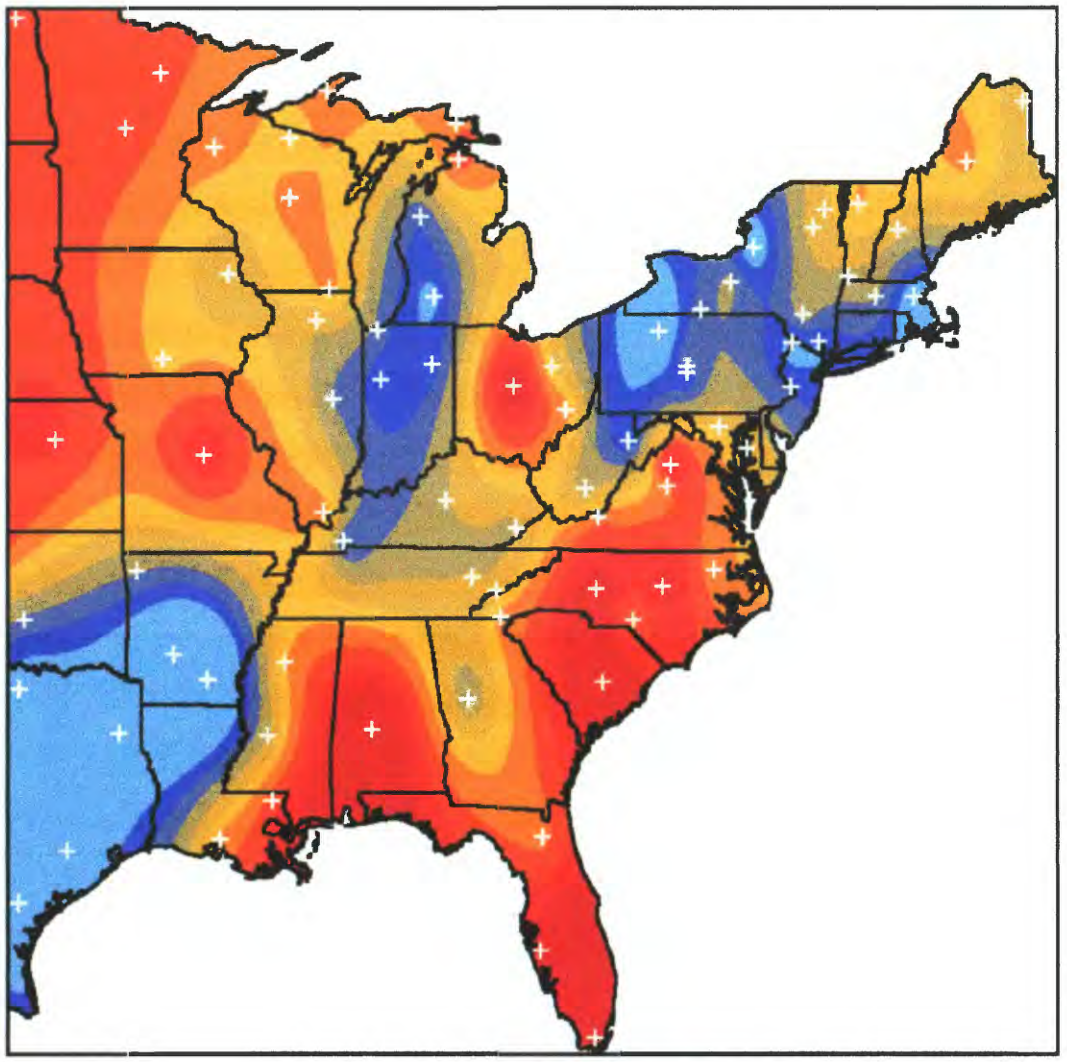
Percent Departures of 1995 Annual Nitrate Ion Concentrations from Predictions of the 1983-94 Seasonalized Trend Model



Percent

Figure 22

Departures of 1995 Annual Precipitation from the Mean Annual Precipitation during 1983-94



Precipitation (Inches)

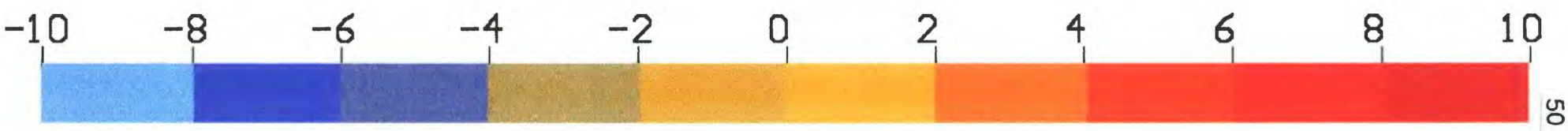
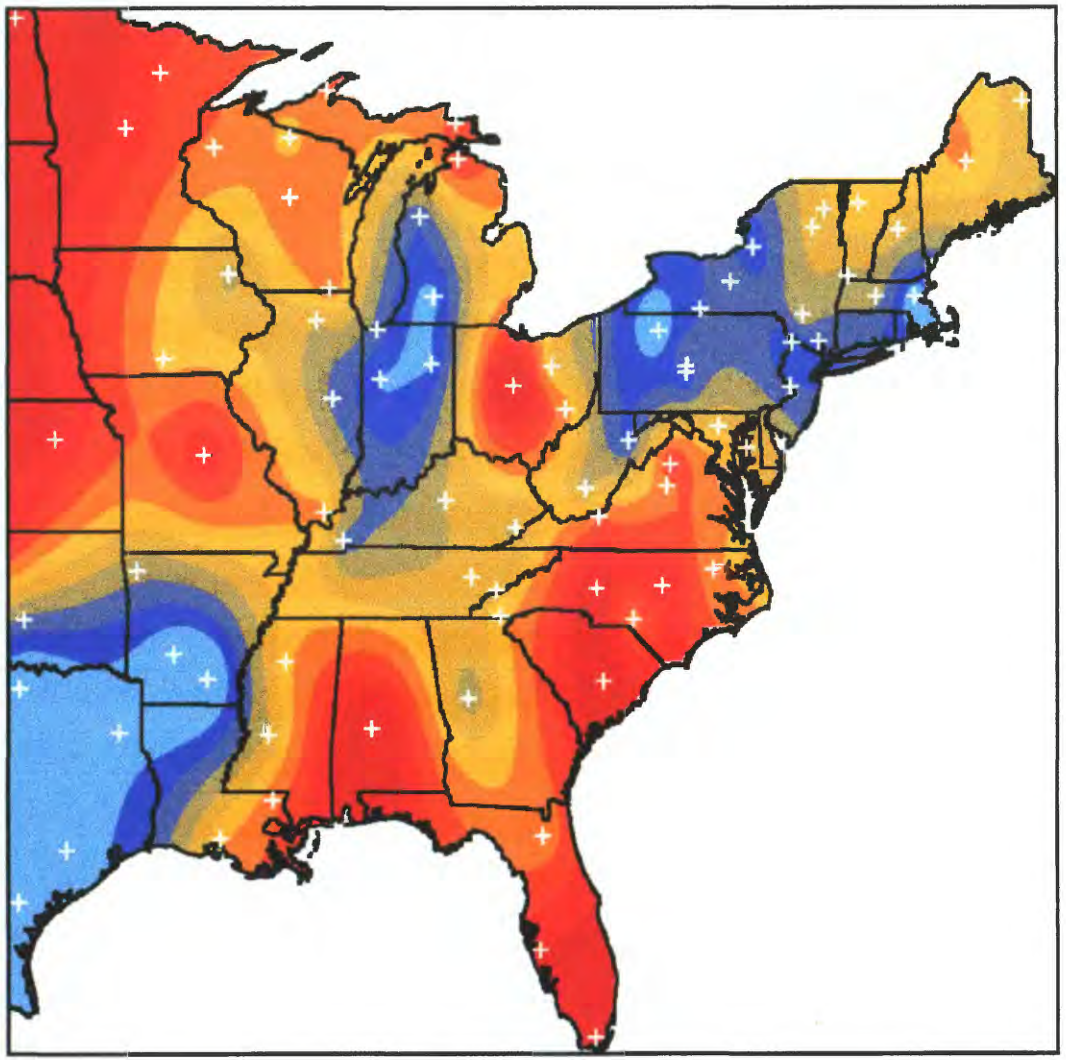
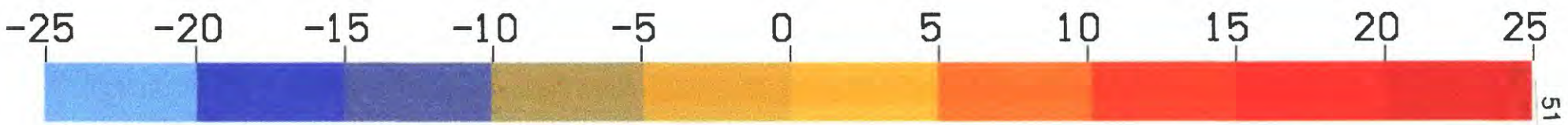


Figure 23

Percent Departures of 1995 Annual Precipitation from the Mean Annual Precipitation during 1983-94



Percent



APPENDIX

Table A.1. Algorithms for adjusting pre-1994 NADP/NTN data for the effects of contamination from the lid o-ring. The "cor" and "unc" subscripts designate the concentrations that are corrected or uncorrected for the o-ring. Volume (Vol) is in mL and pH is in pH units. Volume restriction categories for the algorithms with volume and pH factors are listed. These corrections effectively limit the size of the corrections at very low and very high pH values.

Volume-Only Factors:

$$Ca_{cor} = Ca_{unc} - (3.70/Vol)\ (1 - exp^{-0.00214Vol})$$

$$Mg_{cor} = Mg_{unc} - (2.21/Vol)\ (1 - exp^{-0.00252Vol})$$

$$NH_{4cor} = NH_{4unc} - (8.46/Vol)\ (1 - exp^{-0.00287Vol})$$

$$Cl_{cor} = Cl_{unc} - (5.04/Vol)\ (1 - exp^{-0.00269Vol})$$

Volume and pH Factors:

A. For pH > [5.13 + (2000/Vol)], use the minimum of [5.13 + (2000/Vol)] or 6.86

For pH < [5.13 + (2000/Vol)], use the maximum of [5.13 + (2000/Vol)] or 3.80

$$K_{cor} = K_{unc} - [(61.25 - 23.19pH + 2.20pH^2) / Vol]\ [1 - exp^{-0.00552Vol}]$$

$$NO_{3cor} = NO_{3unc} - [(146.29 - 50.47pH + 4.64pH^2) / Vol]\ [1 - exp^{-0.00593Vol}]$$

B. For pH > [5.13 + (2000/Vol)], use the minimum of [5.13 + (2000/Vol)] or 6.72

For pH < [5.13 + (2000/Vol)], use the maximum of [5.13 + (2000/Vol)] or 3.80

$$Na_{cor} = Na_{unc} - [(163.66 - 64.07pH + 6.46pH^2) / Vol]\ [1 - exp^{-0.00246Vol}]$$

C. For pH > (5.13 + 2000/Vol), use the minimum of (5.13 + 2000/Vol) or 6.67

For pH < (5.13 + 2000/Vol), use the maximum of (5.13 + 2000/Vol) or 3.80

$$SO_{4cor} = SO_{4unc} - [(177.73 - 53.44pH + 4.62pH^2) / Vol]\ [1 - exp^{-0.00230Vol}]$$

Table A.2. Influence of corrections for lid o-ring contamination on volume-weighted mean concentrations in precipitation collected at NADP/NTN sites during the period 1983 through 1993.

Region	Site	pH		Sulfate		Nitrate		Chloride		Ammonium		Calcium		Magnesium		Potassium		Sodium	
		mg/L																	
		Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.
East	al10	4.680	4.653	1.263	1.226	0.708	0.689	0.289	0.287	0.130	0.126	0.1091	0.1074	0.0271	0.0260	0.0295	0.0288	0.1691	0.1639
	fl03	4.660	4.640	1.217	1.139	0.741	0.699	0.506	0.503	0.108	0.105	0.1065	0.1045	0.0410	0.0398	0.0283	0.0269	0.2890	0.2742
	fl11	5.096	5.011	0.719	0.695	0.489	0.471	0.956	0.953	0.088	0.085	0.1407	0.1390	0.0738	0.0728	0.0771	0.0764	0.5379	0.5224
	fl41	4.763	4.731	1.046	1.031	0.725	0.719	0.629	0.627	0.107	0.105	0.1313	0.1299	0.0521	0.0513	0.0414	0.0411	0.3553	0.3527
	fl99	4.687	4.604	1.257	1.209	0.706	0.691	1.677	1.674	0.092	0.089	0.1266	0.1250	0.1168	0.1158	0.0553	0.0520	0.9224	0.8437
	ga20	4.686	4.652	1.240	1.215	0.724	0.711	0.374	0.371	0.166	0.162	0.0844	0.0827	0.0344	0.0334	0.0580	0.0571	0.2128	0.2063
	ga41	4.599	4.568	1.443	1.420	0.737	0.724	0.254	0.252	0.158	0.154	0.0781	0.0763	0.0250	0.0239	0.0398	0.0390	0.1428	0.1373
	ga50	4.789	4.749	0.997	0.961	0.617	0.594	0.322	0.320	0.114	0.110	0.0762	0.0744	0.0317	0.0306	0.0562	0.0551	0.1841	0.1761
	il11	4.329	4.309	2.703	2.683	1.471	1.459	0.136	0.134	0.354	0.350	0.1995	0.1975	0.0273	0.0261	0.0216	0.0205	0.0628	0.0588
	il18	4.499	4.471	2.392	2.371	1.524	1.513	0.124	0.121	0.442	0.437	0.2595	0.2574	0.0488	0.0475	0.0309	0.0300	0.0636	0.0593
	il19	4.392	4.369	2.871	2.847	1.676	1.663	0.167	0.164	0.422	0.418	0.2957	0.2937	0.0650	0.0637	0.0303	0.0292	0.0781	0.0737
	il35	4.457	4.449	2.018	1.920	1.113	1.063	0.169	0.166	0.236	0.232	0.1566	0.1546	0.0242	0.0230	0.0226	0.0210	0.0897	0.0830
	il63	4.409	4.392	2.266	2.220	1.118	1.097	0.192	0.189	0.253	0.249	0.1559	0.1542	0.0240	0.0229	0.0278	0.0264	0.1013	0.0963
	in20	4.348	4.331	2.670	2.613	1.683	1.647	0.137	0.133	0.380	0.375	0.2022	0.2001	0.0392	0.0378	0.0239	0.0224	0.0688	0.0635
	in34	4.405	4.393	2.897	2.807	1.655	1.615	0.171	0.168	0.390	0.384	0.3697	0.3673	0.0700	0.0685	0.0246	0.0231	0.0680	0.0619
	in41	4.340	4.326	2.790	2.719	1.612	1.575	0.173	0.170	0.396	0.391	0.2234	0.2213	0.0391	0.0377	0.0242	0.0227	0.0728	0.0669
	ky03	4.371	4.372	2.190	2.059	1.167	1.111	0.204	0.200	0.212	0.208	0.1108	0.1087	0.0358	0.0345	0.0257	0.0237	0.0769	0.0690
	ky22	4.430	4.405	1.933	1.917	1.129	1.121	0.141	0.138	0.163	0.159	0.1646	0.1627	0.0215	0.0203	0.0203	0.0194	0.0583	0.0548
	ma01	4.517	4.472	1.738	1.681	0.971	0.944	2.912	2.909	0.114	0.110	0.1051	0.1030	0.1989	0.1976	0.0659	0.0635	1.6026	1.5536
	ma08	4.362	4.348	1.907	1.834	1.398	1.357	0.243	0.240	0.176	0.171	0.0597	0.0576	0.0238	0.0224	0.0177	0.0155	0.1265	0.1163
	ma13	4.347	4.328	2.154	2.133	1.112	1.101	0.692	0.689	0.133	0.129	0.0849	0.0831	0.0501	0.0490	0.0229	0.0218	0.3540	0.3501
	md13	4.319	4.303	2.386	2.305	1.447	1.419	0.474	0.471	0.245	0.240	0.0908	0.0887	0.0418	0.0404	0.0250	0.0231	0.2487	0.2275
	me00	4.587	4.542	1.392	1.366	0.859	0.846	0.157	0.153	0.135	0.130	0.0926	0.0900	0.0189	0.0172	0.0207	0.0196	0.0887	0.0838
	me02	4.505	4.480	1.477	1.443	0.920	0.897	0.252	0.249	0.139	0.135	0.0507	0.0487	0.0227	0.0215	0.0183	0.0175	0.1379	0.1341
	me09	4.615	4.573	1.154	1.135	0.795	0.786	0.127	0.125	0.122	0.118	0.0507	0.0486	0.0155	0.0142	0.0134	0.0127	0.0701	0.0664
	me98	4.554	4.526	1.419	1.403	0.806	0.798	1.194	1.191	0.109	0.106	0.0662	0.0645	0.0835	0.0825	0.0343	0.0335	0.6590	0.6548
	mi09	4.486	4.456	1.930	1.895	1.586	1.558	0.096	0.093	0.329	0.324	0.1836	0.1812	0.0346	0.0332	0.0289	0.0278	0.0467	0.0419
	mi26	4.374	4.367	2.621	2.478	1.807	1.704	0.131	0.127	0.424	0.417	0.2061	0.2036	0.0407	0.0391	0.0240	0.0202	0.0603	0.0527
	mi53	4.447	4.418	2.101	2.075	1.745	1.729	0.119	0.116	0.368	0.363	0.2097	0.2074	0.0455	0.0441	0.0220	0.0209	0.0558	0.0510
	mi99	4.739	4.673	1.320	1.300	1.073	1.063	0.086	0.082	0.265	0.259	0.1500	0.1474	0.0272	0.0256	0.0222	0.0215	0.0542	0.0496
	nc03	4.537	4.516	1.564	1.523	0.917	0.892	0.455	0.452	0.177	0.173	0.0742	0.0724	0.0396	0.0385	0.0306	0.0299	0.2519	0.2477
	nc25	4.611	4.588	1.315	1.299	0.690	0.683	0.184	0.182	0.144	0.141	0.0638	0.0626	0.0176	0.0169	0.0220	0.0217	0.1006	0.0984
	nc34	4.459	4.434	1.938	1.920	1.082	1.073	0.250	0.248	0.289	0.286	0.0893	0.0876	0.0285	0.0274	0.0542	0.0534	0.1363	0.1302
	nc36	4.507	4.485	1.551	1.528	0.928	0.915	0.344	0.342	0.152	0.148	0.0650	0.0633	0.0291	0.0281	0.0204	0.0198	0.1923	0.1886
	nc41	4.550	4.522	1.660	1.630	1.023	1.008	0.343	0.340	0.280	0.275	0.0712	0.0694	0.0328	0.0316	0.0464	0.0454	0.1898	0.1844
	nh02	4.390	4.367	1.746	1.729	1.318	1.310	0.158	0.155	0.166	0.162	0.0561	0.0542	0.0176	0.0165	0.0142	0.0133	0.0846	0.0808
	nj99	4.335	4.315	2.234	2.216	1.438	1.429	0.393	0.390	0.214	0.210	0.0956	0.0937	0.0391	0.0380	0.0260	0.0248	0.2011	0.1945
	ny08	4.207	4.187	3.103	3.080	2.008	1.995	0.143	0.140	0.371	0.365	0.1397	0.1372	0.0272	0.0256	0.0164	0.0147	0.0569	0.0512
	ny10	4.228	4.214	2.981	2.925	1.933	1.898	0.158	0.155	0.344	0.339	0.1525	0.1503	0.0280	0.0267	0.0295	0.0279	0.0630	0.0573
	ny20	4.399	4.373	1.820	1.792	1.382	1.369	0.098	0.095	0.197	0.192	0.0853	0.0831	0.0172	0.0159	0.0131	0.0121	0.0471	0.0428
	ny52	4.236	4.226	2.692	2.640	2.187	2.144	0.161	0.158	0.352	0.348	0.1474	0.1454	0.0284	0.0271	0.0238	0.0223	0.0709	0.0660
	ny65	4.266	4.243	2.556	2.533	1.594	1.581	0.111	0.108	0.250	0.244	0.0926	0.0901	0.0187	0.0173	0.0141	0.0127	0.0456	0.0403

Table A.2 (continued).

Region	Site	pH		Sulfate		Nitrate		Chloride		Ammonium		Calcium		Magnesium		Potassium		Sodium	
		mg/L																	
		Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.
	ny68	4.318	4.300	2.110	2.079	1.481	1.458	0.162	0.159	0.191	0.187	0.0645	0.0625	0.0184	0.0172	0.0166	0.0155	0.0778	0.0686
	ny99	4.276	4.271	2.272	2.195	1.570	1.522	0.419	0.416	0.193	0.189	0.0797	0.0778	0.0352	0.0340	0.0262	0.0250	0.1848	0.1779
	oh17	4.280	4.260	2.915	2.896	1.771	1.761	0.149	0.146	0.367	0.362	0.1795	0.1773	0.0365	0.0352	0.0327	0.0313	0.0717	0.0671
	oh49	4.183	4.167	3.368	3.349	1.703	1.693	0.174	0.171	0.278	0.273	0.1677	0.1656	0.0313	0.0301	0.0383	0.0367	0.0647	0.0599
	oh71	4.240	4.231	3.182	3.089	1.828	1.775	0.145	0.141	0.404	0.398	0.1752	0.1728	0.0332	0.0317	0.0220	0.0203	0.0614	0.0560
	pa15	4.194	4.183	2.915	2.845	1.858	1.814	0.164	0.161	0.255	0.250	0.1117	0.1093	0.0214	0.0199	0.0241	0.0211	0.0602	0.0521
	pa29	4.198	4.183	2.930	2.912	1.777	1.768	0.144	0.142	0.266	0.262	0.1116	0.1097	0.0214	0.0202	0.0233	0.0221	0.0504	0.0462
	pa42	4.186	4.199	2.994	2.766	1.991	1.853	0.171	0.167	0.285	0.279	0.1159	0.1134	0.0239	0.0222	0.0312	0.0271	0.0660	0.0564
	tn00	4.358	4.341	2.247	2.223	1.054	1.043	0.197	0.194	0.183	0.179	0.1124	0.1107	0.0222	0.0212	0.0222	0.0213	0.0877	0.0837
	tn11	4.494	4.474	1.681	1.648	0.920	0.902	0.114	0.112	0.178	0.175	0.0907	0.0890	0.0173	0.0163	0.0349	0.0335	0.0611	0.0572
	va13	4.482	4.450	1.828	1.809	1.034	1.025	0.125	0.122	0.186	0.181	0.1142	0.1121	0.0236	0.0223	0.0548	0.0537	0.0637	0.0596
	va28	4.542	4.518	1.526	1.500	0.812	0.797	0.159	0.157	0.185	0.182	0.0524	0.0508	0.0161	0.0152	0.0187	0.0180	0.0800	0.0724
	vt01	4.334	4.331	2.175	2.062	1.572	1.507	0.138	0.134	0.226	0.221	0.1041	0.1017	0.0252	0.0237	0.0213	0.0198	0.0716	0.0655
	wi28	4.706	4.657	1.855	1.834	1.406	1.393	0.097	0.094	0.455	0.449	0.2511	0.2489	0.0406	0.0392	0.0285	0.0277	0.0545	0.0498
	wi36	4.778	4.720	1.349	1.299	1.120	1.081	0.078	0.075	0.308	0.302	0.1870	0.1845	0.0307	0.0291	0.0245	0.0234	0.0437	0.0385
	wi37	4.933	4.884	1.410	1.353	1.229	1.183	0.081	0.078	0.442	0.436	0.2462	0.2438	0.0390	0.0375	0.0302	0.0288	0.0482	0.0427
	wv04	4.362	4.341	2.053	2.034	1.243	1.232	0.116	0.113	0.182	0.177	0.0973	0.0954	0.0175	0.0163	0.0258	0.0248	0.0503	0.0465
	wv18	4.239	4.223	2.854	2.825	1.616	1.602	0.126	0.123	0.225	0.220	0.1593	0.1573	0.0219	0.0207	0.0238	0.0225	0.0496	0.0452
West	ak03	5.357	5.142	0.237	0.213	0.125	0.114	0.082	0.079	0.042	0.040	0.0356	0.0329	0.0087	0.0073	0.0167	0.0161	0.0406	0.0328
	ar02	4.843	4.812	1.096	1.065	0.752	0.729	0.251	0.249	0.217	0.214	0.1092	0.1078	0.0264	0.0256	0.0522	0.0516	0.1488	0.1442
	ar16	4.751	4.712	1.206	1.184	0.827	0.815	0.171	0.168	0.191	0.187	0.1425	0.1408	0.0246	0.0236	0.0418	0.0413	0.1055	0.1025
	ar27	4.950	4.892	1.184	1.163	0.870	0.858	0.168	0.166	0.275	0.271	0.1845	0.1828	0.0238	0.0227	0.0337	0.0326	0.1068	0.1017
	az03	5.288	5.119	0.647	0.626	0.746	0.735	0.126	0.122	0.103	0.098	0.2710	0.2680	0.0519	0.0501	0.0180	0.0170	0.0897	0.0820
	az06	5.208	5.082	0.668	0.645	0.619	0.604	0.471	0.467	0.169	0.164	0.1400	0.1377	0.0442	0.0428	0.0222	0.0206	0.2749	0.2681
	az99	4.803	4.729	1.284	1.247	0.723	0.702	0.133	0.129	0.159	0.153	0.1719	0.1690	0.0255	0.0236	0.0192	0.0178	0.0907	0.0834
	ca42	5.099	4.918	0.517	0.446	0.798	0.745	0.513	0.509	0.167	0.161	0.1128	0.1099	0.0429	0.0411	0.0235	0.0188	0.2908	0.2158
	ca45	5.447	5.236	0.279	0.256	0.253	0.239	0.621	0.619	0.058	0.056	0.0351	0.0336	0.0462	0.0452	0.0216	0.0196	0.3466	0.3190
	ca75	5.510	5.360	0.339	0.320	0.574	0.566	0.134	0.132	0.208	0.205	0.0577	0.0562	0.0171	0.0161	0.0247	0.0243	0.0862	0.0795
	ca88	5.889	5.698	0.485	0.468	0.689	0.674	0.413	0.411	0.449	0.445	0.0552	0.0534	0.0361	0.0350	0.0236	0.0226	0.2370	0.2282
	ca98	5.269	5.063	0.347	0.325	0.524	0.511	0.146	0.142	0.099	0.096	0.0680	0.0657	0.0169	0.0153	0.0203	0.0192	0.0911	0.0748
	ca99	5.436	5.286	0.311	0.278	0.510	0.478	0.134	0.131	0.144	0.141	0.0517	0.0499	0.0149	0.0140	0.0139	0.0134	0.0839	0.0736
	co00	5.472	5.186	0.857	0.820	0.715	0.687	0.111	0.105	0.259	0.250	0.2257	0.2216	0.0273	0.0248	0.0361	0.0308	0.1411	0.1227
	co01	5.695	5.433	0.925	0.903	1.195	1.181	0.125	0.121	0.440	0.432	0.3582	0.3550	0.0333	0.0313	0.0530	0.0509	0.0867	0.0750
	co15	5.113	4.940	0.862	0.830	0.922	0.902	0.108	0.103	0.153	0.145	0.2554	0.2514	0.0386	0.0361	0.0257	0.0246	0.0884	0.0796
	co19	5.156	4.980	0.750	0.724	0.966	0.952	0.105	0.101	0.216	0.208	0.2084	0.2049	0.0281	0.0259	0.0579	0.0571	0.0671	0.0595
	co21	4.921	4.816	0.948	0.925	1.247	1.234	0.095	0.091	0.212	0.205	0.2279	0.2247	0.0346	0.0326	0.0500	0.0491	0.0579	0.0518
	co22	5.503	5.269	0.970	0.947	1.260	1.245	0.101	0.096	0.500	0.492	0.2421	0.2387	0.0305	0.0283	0.0370	0.0352	0.0694	0.0585
	co98	5.173	4.993	0.601	0.569	0.688	0.664	0.081	0.076	0.121	0.114	0.1566	0.1530	0.0229	0.0208	0.0192	0.0181	0.0622	0.0527
	co99	4.878	4.802	1.046	1.025	0.891	0.879	0.092	0.089	0.120	0.115	0.4012	0.3985	0.0393	0.0376	0.0205	0.0192	0.0670	0.0601
	id03	5.488	5.246	0.569	0.541	0.662	0.644	0.618	0.613	0.207	0.200	0.3179	0.3145	0.0376	0.0355	0.0292	0.0274	0.4004	0.3888
	id11	5.652	5.309	0.435	0.397	0.540	0.507	0.125	0.119	0.168	0.160	0.1680	0.1638	0.0254	0.0229	0.0301	0.0274	0.1615	0.1456
	ks31	4.983	4.927	1.314	1.256	1.240	1.184	0.123	0.120	0.337	0.331	0.3159	0.3137	0.0303	0.0290	0.0311	0.0294	0.0793	0.0709

Table A.2 (continued).

Region	Site	pH		Sulfate		Nitrate		Chloride		Ammonium		Calcium		Magnesium		Potassium		Sodium	
		mg/L																	
		Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.	Uncorr.	Corr.
	la12	4.815	4.784	1.060	1.034	0.730	0.714	0.615	0.613	0.203	0.200	0.1019	0.1006	0.0454	0.0446	0.0309	0.0304	0.3313	0.3249
	la30	4.791	4.757	1.107	1.095	0.726	0.720	0.489	0.487	0.195	0.193	0.0945	0.0932	0.0395	0.0388	0.0275	0.0273	0.2794	0.2772
	mn16	5.041	4.955	1.065	1.034	1.016	0.989	0.078	0.075	0.330	0.325	0.1908	0.1884	0.0328	0.0313	0.0299	0.0290	0.0493	0.0436
	mn18	4.990	4.892	0.956	0.926	0.899	0.880	0.077	0.073	0.245	0.240	0.1597	0.1570	0.0271	0.0254	0.0207	0.0200	0.0413	0.0360
	mn23	5.159	5.064	1.005	0.970	1.036	1.001	0.069	0.066	0.397	0.392	0.2022	0.1998	0.0342	0.0327	0.0231	0.0216	0.0430	0.0362
	mn27	5.308	5.214	1.368	1.354	1.336	1.328	0.096	0.093	0.627	0.622	0.3028	0.3007	0.0491	0.0478	0.0424	0.0412	0.0564	0.0497
	mo03	4.679	4.648	1.574	1.524	1.112	1.086	0.131	0.128	0.271	0.267	0.2146	0.2125	0.0279	0.0266	0.0309	0.0284	0.0840	0.0777
	mo05	4.588	4.561	1.573	1.553	1.012	1.001	0.175	0.173	0.225	0.222	0.1274	0.1258	0.0263	0.0253	0.0468	0.0463	0.1045	0.1012
	mt05	5.238	5.079	0.392	0.363	0.363	0.345	0.066	0.062	0.073	0.068	0.0728	0.0702	0.0144	0.0129	0.0232	0.0225	0.0510	0.0452
	nd11	5.572	5.399	0.925	0.907	1.076	1.065	0.091	0.088	0.487	0.481	0.2388	0.2363	0.0492	0.0476	0.0462	0.0445	0.0634	0.0542
	ne15	5.210	5.131	1.493	1.479	1.359	1.351	0.115	0.112	0.578	0.573	0.3394	0.3374	0.0351	0.0340	0.0386	0.0377	0.0706	0.0647
	nm07	4.997	4.890	0.856	0.833	0.815	0.802	0.095	0.091	0.141	0.135	0.2283	0.2256	0.0227	0.0210	0.0325	0.0319	0.0655	0.0599
	nm09	4.954	4.840	0.900	0.868	0.857	0.837	0.106	0.102	0.143	0.137	0.2081	0.2048	0.0256	0.0236	0.0205	0.0190	0.0716	0.0639
	ok00	5.113	5.041	1.147	1.096	1.124	1.074	0.212	0.209	0.315	0.310	0.3179	0.3156	0.0338	0.0324	0.0361	0.0346	0.1407	0.1334
	ok17	5.022	4.980	1.101	1.026	0.930	0.879	0.193	0.190	0.252	0.247	0.2913	0.2891	0.0337	0.0324	0.0574	0.0430	0.1170	0.1018
	or02	5.403	5.255	0.401	0.388	0.116	0.113	1.553	1.550	0.029	0.028	0.0574	0.0560	0.1035	0.1027	0.0368	0.0363	0.8493	0.8376
	or09	5.382	5.128	0.298	0.272	0.397	0.382	0.106	0.100	0.074	0.069	0.0792	0.0758	0.0174	0.0152	0.0426	0.0415	0.0842	0.0750
	or10	5.378	5.285	0.218	0.208	0.133	0.130	0.328	0.326	0.029	0.029	0.0306	0.0296	0.0243	0.0238	0.0124	0.0123	0.1883	0.1852
	or97	5.416	5.269	0.365	0.351	0.215	0.209	0.730	0.727	0.067	0.064	0.0522	0.0503	0.0513	0.0501	0.0242	0.0235	0.4028	0.3983
	or98	5.227	5.142	0.405	0.394	0.318	0.313	0.583	0.581	0.074	0.072	0.0458	0.0445	0.0420	0.0413	0.0236	0.0235	0.3305	0.3275
	sd08	5.387	5.252	0.795	0.708	0.978	0.914	0.080	0.076	0.341	0.334	0.2004	0.1973	0.0246	0.0227	0.0283	0.0259	0.0552	0.0472
	sd99	5.470	5.342	1.058	1.040	1.220	1.206	0.084	0.081	0.553	0.548	0.2484	0.2462	0.0418	0.0404	0.0307	0.0293	0.0560	0.0481
	tx04	5.517	5.329	0.905	0.879	0.606	0.591	0.116	0.112	0.192	0.186	0.4803	0.4776	0.0247	0.0230	0.0280	0.0260	0.0989	0.0874
	tx21	4.673	4.641	1.430	1.411	0.791	0.782	0.338	0.336	0.181	0.178	0.1376	0.1359	0.0340	0.0330	0.0401	0.0393	0.2041	0.2004
	tx38	4.902	4.848	1.121	1.101	0.715	0.703	0.385	0.382	0.213	0.209	0.1430	0.1414	0.0395	0.0385	0.0805	0.0800	0.2282	0.2225
	tx56	5.027	4.981	1.149	1.090	0.901	0.863	0.242	0.240	0.264	0.259	0.3066	0.3046	0.0303	0.0290	0.0372	0.0354	0.1547	0.1437
	ut01	6.057	5.822	0.855	0.831	0.903	0.883	0.543	0.539	0.706	0.698	0.4279	0.4249	0.0558	0.0539	0.0321	0.0290	0.2975	0.2822
	wa14	5.410	5.188	0.275	0.255	0.083	0.079	0.949	0.947	0.026	0.025	0.0369	0.0358	0.0633	0.0626	0.0232	0.0220	0.5225	0.4874
	wy06	5.186	4.998	0.704	0.674	0.747	0.726	0.136	0.130	0.132	0.125	0.2262	0.2223	0.0352	0.0328	0.0228	0.0213	0.0965	0.0864
	wy08	5.523	5.241	0.442	0.414	0.504	0.487	0.101	0.095	0.125	0.118	0.2304	0.2268	0.0284	0.0263	0.0292	0.0276	0.0689	0.0580
	wy99	5.341	5.149	0.883	0.833	0.922	0.875	0.089	0.084	0.241	0.233	0.2982	0.2947	0.0354	0.0331	0.0331	0.0308	0.0690	0.0591

Table A.3. Estimated linear annual trends in $\log_{10}$-transformed ionic concentrations (μeq/L) in preciptation collected from 1983 through 1994.

Region	Site	Hydrogen Ion		Sulfate		Nitrate		Chloride	
		b_{year}	p	b_{year}	p	b_{year}	p	b_{year}	p
NE	il11	-0.0079	0.0223	-0.0067	0.0318	0.0013	0.7158	-0.0040	0.2390
	il18	-0.0061	0.2997	-0.0077	0.0746	0.0049	0.3530	-0.0042	0.3815
	il19	-0.0119	0.0163	-0.0099	0.0055	-0.0050	0.1609	-0.0065	0.1466
	il35	0.0036	0.5449	-0.0059	0.1972	-0.0013	0.8180	-0.0048	0.4668
	il63	0.0004	0.8970	-0.0065	0.0367	0.0012	0.7693	-0.0039	0.3553
	in20	-0.0042	0.3220	-0.0137	0.0003	-0.0046	0.3446	-0.0178	0.0018
	in22	-0.0005	0.9294	0.0037	0.4555	0.0158	0.0249	-0.0083	0.3505
	in34	-0.0135	0.0013	-0.0067	0.0437	-0.0010	0.8112	-0.0055	0.3293
	in41	-0.0086	0.0321	-0.0080	0.0366	-0.0066	0.1141	-0.0148	0.0058
	ky03	-0.0040	0.3780	-0.0023	0.5826	0.0008	0.8827	-0.0114	0.0848
	ky22	-0.0087	0.0422	-0.0134	0.0052	-0.0094	0.0219	-0.0269	0.0001
	ky35	-0.0079	0.1202	-0.0067	0.1660	-0.0110	0.1081	-0.0131	0.0113
	ky38	-0.0028	0.6512	-0.0036	0.4968	0.0041	0.4610	-0.0021	0.7782
	ma01	0.0075	0.4254	-0.0012	0.8630	0.0136	0.1142	0.0000	0.9992
	ma08	-0.0049	0.5385	-0.0110	0.1542	-0.0012	0.8839	-0.0078	0.3066
	ma13	-0.0107	0.0178	-0.0066	0.1044	0.0052	0.3863	-0.0150	0.0421
	md03	-0.0005	0.9042	-0.0025	0.5816	-0.0006	0.8813	-0.0147	0.0725
	md13	-0.0053	0.2423	-0.0061	0.1813	-0.0038	0.4338	-0.0091	0.1697
	me00	-0.0082	0.1150	-0.0078	0.0780	0.0064	0.2352	-0.0118	0.0624
	me02	0.0020	0.7149	-0.0042	0.4572	0.0127	0.0504	-0.0094	0.3398
	me09	0.0021	0.7056	-0.0037	0.5382	0.0088	0.1546	-0.0094	0.1688
	mi09	-0.0093	0.0302	-0.0111	0.0040	-0.0013	0.7267	-0.0078	0.0714
	mi26	-0.0103	0.0364	-0.0139	0.0004	-0.0052	0.2354	-0.0090	0.0343
	mi53	-0.0113	0.0211	-0.0079	0.0406	0.0001	0.9885	-0.0087	0.0615
	mi98	-0.0159	0.0057	-0.0147	0.0127	-0.0046	0.3689	-0.0118	0.0226
	mi99	-0.0068	0.1366	-0.0108	0.0039	0.0028	0.4060	-0.0143	0.0024
	nh02	-0.0032	0.4690	-0.0070	0.1637	0.0034	0.5293	-0.0074	0.2576
	nj99	-0.0034	0.4997	-0.0008	0.8602	0.0016	0.7765	-0.0070	0.2478
	ny08	-0.0075	0.0284	-0.0065	0.0622	-0.0044	0.2342	-0.0115	0.0084
	ny10	-0.0086	0.0056	-0.0153	0.0001	-0.0024	0.4344	-0.0183	0.0001
	ny20	-0.0020	0.6193	-0.0070	0.0972	-0.0021	0.6233	-0.0178	0.0007
	ny52	-0.0087	0.0055	-0.0099	0.0031	-0.0050	0.1262	-0.0165	0.0001
	ny65	0.0009	0.7685	-0.0028	0.3993	0.0014	0.6912	-0.0054	0.2310
	ny68	0.0015	0.8357	-0.0027	0.7279	0.0038	0.5401	-0.0025	0.7169
	ny98	-0.0113	0.0205	-0.0150	0.0075	-0.0065	0.1960	-0.0103	0.0581
	ny99	-0.0049	0.3803	-0.0076	0.1905	-0.0078	0.2742	0.0061	0.4115
	oh09	-0.0053	0.2185	-0.0057	0.1677	-0.0027	0.6074	-0.0030	0.6104
	oh17	-0.0008	0.7971	-0.0020	0.4831	0.0011	0.7477	-0.0021	0.6170
	oh49	-0.0005	0.8617	-0.0020	0.5209	0.0031	0.4445	-0.0037	0.4285
	oh71	-0.0037	0.1700	-0.0038	0.1961	-0.0024	0.4937	-0.0060	0.1565
	pa15	-0.0115	0.0029	-0.0107	0.0146	-0.0112	0.0063	-0.0124	0.0017
	pa29	-0.0073	0.0111	-0.0063	0.0646	-0.0026	0.4727	-0.0074	0.0544
	pa42	-0.0066	0.1153	-0.0090	0.0576	-0.0068	0.1098	-0.0061	0.1216
	pa72	-0.0084	0.1414	-0.0114	0.0576	-0.0058	0.3409	-0.0112	0.1129
	va00	-0.0071	0.2086	-0.0060	0.3054	-0.0095	0.1301	-0.0022	0.8013
	va13	0.0040	0.4664	0.0005	0.9296	0.0057	0.3405	-0.0089	0.1060
	va28	-0.0108	0.0491	-0.0140	0.0235	-0.0104	0.1391	-0.0249	0.0092
	vt01	0.0089	0.0955	0.0032	0.5675	0.0115	0.0357	0.0001	0.9879
	vt99	-0.0014	0.7963	-0.0025	0.6412	0.0026	0.6647	-0.0059	0.1998
	wi28	-0.0268	0.0013	-0.0218	0.0001	-0.0068	0.0830	-0.0179	0.0001
	wi36	-0.0114	0.1392	-0.0149	0.0283	0.0021	0.6941	-0.0123	0.0284
	wi37	-0.0120	0.1501	-0.0162	0.0025	0.0002	0.9562	-0.0152	0.0005
	wi99	-0.0062	0.3222	-0.0119	0.0216	-0.0014	0.8120	-0.0179	0.0035
	wv04	-0.0108	0.0067	-0.0170	0.0001	-0.0067	0.1018	-0.0167	0.0003
	wv18	0.0034	0.2819	0.0011	0.7326	0.0028	0.4619	-0.0075	0.0211
SE	al10	0.0046	0.3598	-0.0114	0.0196	-0.0055	0.2485	-0.0130	0.0509
	al99	-0.0100	0.2235	-0.0133	0.0717	0.0024	0.7559	-0.0043	0.6177
	fl03	0.0032	0.4412	-0.0013	0.8206	0.0122	0.0799	-0.0106	0.1122
	fl11	0.0013	0.8537	-0.0017	0.7393	0.0124	0.1958	0.0067	0.2483
	fl14	-0.0046	0.5881	-0.0033	0.7478	0.0056	0.5341	-0.0054	0.5773
	fl41	0.0074	0.4415	-0.0037	0.5991	0.0066	0.3516	-0.0058	0.4472
	ga20	-0.0105	0.1714	-0.0099	0.1865	0.0039	0.5734	-0.0021	0.7854
	ga41	-0.0026	0.6774	-0.0082	0.1171	-0.0038	0.4310	-0.0163	0.0049
	ga50	0.0059	0.3955	-0.0052	0.5223	0.0057	0.5249	-0.0094	0.2148
	ms10	-0.0044	0.5831	-0.0159	0.0035	-0.0024	0.6900	-0.0121	0.0699
	ms30	-0.0091	0.2335	-0.0191	0.0251	-0.0069	0.3997	-0.0078	0.3072
	nc03	-0.0077	0.1809	-0.0119	0.0314	-0.0054	0.3444	-0.0106	0.1246
	nc25	-0.0072	0.1975	-0.0141	0.0083	-0.0062	0.2365	-0.0068	0.3808
	nc34	-0.0019	0.7005	-0.0026	0.5537	-0.0034	0.4351	-0.0009	0.8916
	nc36	0.0123	0.0448	0.0088	0.1231	0.0160	0.0070	0.0029	0.7070
	nc41	-0.0108	0.0868	-0.0102	0.0774	-0.0060	0.2626	-0.0136	0.0689
	sc06	-0.0063	0.4159	-0.0112	0.1255	0.0070	0.4848	-0.0011	0.9253
	tn00	-0.0026	0.5282	-0.0105	0.0100	-0.0026	0.5298	-0.0139	0.0115
	tn11	-0.0016	0.7231	-0.0062	0.2070	-0.0040	0.3471	-0.0101	0.0646
	tn14	0.0058	0.2280	0.0032	0.5361	0.0113	0.0292	-0.0131	0.0661

Table A.3 (continued).

Region	Site	Hydrogen Ion		Sulfate		Nitrate		Chloride	
		b_{year}	p	b_{year}	p	b_{year}	p	b_{year}	p
West	ak03	-0.0078	0.1649	-0.0175	0.0590	0.0294	0.0031	-0.0051	0.5436
	ar02	0.0038	0.5822	-0.0080	0.0567	0.0022	0.6158	0.0028	0.5906
	ar03	-0.0045	0.3538	-0.0066	0.2094	-0.0027	0.5885	0.0003	0.9613
	ar16	0.0037	0.5186	-0.0040	0.3610	0.0004	0.9299	-0.0101	0.0304
	ar27	-0.0104	0.0770	-0.0135	0.0019	-0.0036	0.3342	-0.0068	0.2118
	az03	-0.0070	0.5031	-0.0236	0.0040	0.0032	0.6712	-0.0151	0.0927
	az06	-0.0034	0.6938	-0.0130	0.1347	-0.0081	0.4321	-0.0045	0.7511
	az99	-0.0366	0.0002	-0.0294	0.0007	-0.0014	0.8583	-0.0031	0.7388
	ca42	-0.0372	0.0044	-0.0229	0.0429	-0.0156	0.2159	-0.0085	0.5579
	ca45	-0.0146	0.0347	-0.0243	0.0005	0.0142	0.2560	-0.0184	0.0565
	ca75	-0.0293	0.0061	-0.0157	0.0859	0.0131	0.3207	-0.0167	0.1106
	ca88	-0.0260	0.0493	-0.0139	0.0162	0.0011	0.8863	-0.0103	0.3758
	ca98	-0.0247	0.0678	-0.0361	0.0025	-0.0133	0.4110	-0.0343	0.0180
	ca99	-0.0088	0.2566	-0.0179	0.1957	0.0038	0.8025	-0.0085	0.3723
	co00	-0.0132	0.1321	-0.0187	0.0208	-0.0074	0.3478	-0.0244	0.0046
	co01	-0.0299	0.0263	-0.0028	0.6968	-0.0031	0.6510	-0.0183	0.1073
	co02	0.0013	0.8367	0.0001	0.9926	0.0198	0.0227	-0.0073	0.4296
	co15	-0.0014	0.7650	-0.0101	0.0604	0.0059	0.2895	-0.0155	0.0116
	co19	-0.0047	0.4830	-0.0176	0.0036	0.0113	0.0252	-0.0065	0.3715
	co21	0.0009	0.8308	-0.0080	0.1495	0.0067	0.1281	-0.0133	0.0285
	co22	-0.0230	0.0154	-0.0176	0.0047	-0.0048	0.3893	-0.0182	0.0043
	co97	0.0041	0.4554	0.0139	0.0074	0.0310	0.0001	0.0089	0.1709
	co98	-0.0087	0.1500	-0.0200	0.0005	-0.0004	0.9445	-0.0171	0.0019
	co99	-0.0127	0.0521	-0.0113	0.0081	0.0025	0.6494	-0.0059	0.3638
	ia08	0.0086	0.4632	-0.0033	0.4813	0.0100	0.0596	-0.0097	0.0909
	ia23	-0.0168	0.2193	-0.0098	0.2296	0.0130	0.1534	-0.0065	0.2958
	id03	-0.0024	0.7977	-0.0141	0.1391	0.0152	0.0613	-0.0197	0.0418
	id11	-0.0285	0.0048	0.0004	0.9704	0.0249	0.0039	-0.0079	0.4423
	id15	-0.0160	0.0883	-0.0071	0.3135	0.0140	0.0379	-0.0045	0.5472
	ks07	-0.0066	0.3149	-0.0087	0.0668	0.0008	0.8994	-0.0183	0.0030
	ks31	-0.0098	0.1796	-0.0027	0.6234	0.0062	0.1499	-0.0075	0.2307
	ks32	-0.0128	0.2160	-0.0029	0.7280	0.0148	0.0370	-0.0122	0.1214
	la12	-0.0029	0.5603	-0.0104	0.0230	-0.0030	0.5471	-0.0099	0.1090
	la30	0.0043	0.4666	-0.0104	0.0453	-0.0040	0.3912	-0.0140	0.0453
	mn16	-0.0172	0.0734	-0.0264	0.0003	-0.0075	0.1860	-0.0266	0.0001
	mn18	-0.0011	0.8722	-0.0133	0.0035	-0.0004	0.9294	-0.0194	0.0001
	mn23	-0.0028	0.8520	-0.0068	0.3498	0.0073	0.2519	-0.0040	0.4793
	mn27	-0.0137	0.3366	-0.0183	0.0084	-0.0053	0.3772	-0.0237	0.0001
	mo03	-0.0149	0.0068	-0.0155	0.0006	-0.0048	0.2739	-0.0099	0.0378
	mo05	-0.0034	0.5337	-0.0071	0.1174	-0.0025	0.5366	-0.0090	0.0884
	mt00	-0.0022	0.7876	-0.0093	0.2010	0.0076	0.3329	-0.0215	0.0121
	mt05	-0.0041	0.2620	-0.0146	0.0006	0.0046	0.4269	-0.0243	0.0001
	mt07	0.0002	0.9741	-0.0103	0.1575	0.0091	0.2344	-0.0212	0.0041
	mt13	-0.0105	0.3998	-0.0003	0.9746	0.0095	0.2846	-0.0214	0.0085
	nd07	-0.0125	0.1897	-0.0165	0.0306	-0.0034	0.6842	-0.0195	0.0114
	nd08	-0.0102	0.4418	-0.0096	0.2117	0.0008	0.9213	-0.0135	0.0697
	nd11	-0.0151	0.3370	-0.0190	0.0196	-0.0094	0.2788	-0.0215	0.0135
	ne15	-0.0289	0.0287	-0.0114	0.0326	0.0030	0.4631	-0.0174	0.0013
	nm07	-0.0048	0.4150	-0.0166	0.0025	-0.0000	0.9990	-0.0297	0.0001
	nm08	-0.0238	0.0010	-0.0130	0.1669	0.0065	0.4287	-0.0181	0.1045
	nm09	-0.0156	0.0104	-0.0161	0.0037	-0.0020	0.7348	-0.0189	0.0008
	nm12	-0.0139	0.3149	0.0101	0.3489	0.0485	0.0064	-0.0176	0.0947
	ok00	-0.0059	0.5357	-0.0096	0.1850	-0.0003	0.9699	-0.0286	0.0039
	ok17	-0.0063	0.5769	-0.0127	0.1028	-0.0016	0.8316	-0.0205	0.0112
	or02	-0.0090	0.0716	-0.0164	0.0057	0.0263	0.0093	-0.0176	0.1037
	or09	-0.0078	0.2198	-0.0017	0.8730	0.0268	0.0142	-0.0382	0.0001
	or10	-0.0035	0.2885	-0.0180	0.0001	0.0197	0.0137	-0.0149	0.0893
	or18	-0.0186	0.0004	-0.0038	0.6025	0.0175	0.0539	-0.0162	0.0118
	or97	-0.0163	0.0066	-0.0151	0.0064	0.0144	0.0374	-0.0049	0.5648
	or98	-0.0078	0.0560	-0.0095	0.0385	0.0067	0.2232	-0.0046	0.5240
	sd08	-0.0100	0.2881	-0.0147	0.0800	-0.0007	0.9371	-0.0170	0.0459
	sd99	-0.0487	0.0068	-0.0158	0.0616	-0.0026	0.6719	-0.0108	0.0644
	tx03	0.0110	0.3592	-0.0016	0.8229	0.0037	0.5855	-0.0063	0.4529
	tx04	-0.0053	0.6905	0.0071	0.4017	0.0228	0.0150	-0.0062	0.5219
	tx10	0.0078	0.3687	-0.0003	0.9698	0.0073	0.4139	-0.0122	0.1872
	tx16	-0.0139	0.3239	0.0049	0.5639	0.0109	0.2383	0.0073	0.4919
	tx21	-0.0012	0.8104	-0.0070	0.0722	-0.0045	0.2785	-0.0120	0.0512
	tx22	-0.0302	0.0498	-0.0016	0.8464	0.0217	0.0191	-0.0003	0.9727
	tx38	0.0039	0.5252	-0.0097	0.0642	-0.0011	0.8494	-0.0196	0.0019
	tx56	-0.0016	0.8836	-0.0106	0.0744	0.0018	0.7848	-0.0190	0.0271
	ut01	-0.0693	0.0001	-0.0070	0.2855	0.0017	0.8073	-0.0191	0.0809
	wa14	-0.0067	0.3636	-0.0081	0.2183	0.0278	0.0001	-0.0089	0.3204
	wa19	-0.0167	0.0021	-0.0140	0.0888	0.0145	0.1039	-0.0142	0.1509
	wa21	-0.0076	0.2654	-0.0141	0.0612	0.0081	0.3940	-0.0415	0.0005
	wy02	-0.0268	0.0001	-0.0347	0.0001	-0.0036	0.6365	-0.0423	0.0001
	wy06	0.0055	0.3794	-0.0095	0.2176	0.0152	0.0289	-0.0174	0.0301
	wy08	-0.0210	0.0041	0.0056	0.4784	0.0254	0.0019	-0.0100	0.1477
	wy99	-0.0111	0.0807	-0.0146	0.0218	0.0005	0.9254	-0.0226	0.0001

Table A.3 (continued).

Region	Site	Ammonium		Calcium		Magnesium		Potassium		Sodium	
		b_{year}	p	b_{year}	p	b_{year}	p	b_{year}	p	b_{year}	p
NE	il11	0.0117	0.0355	-0.0129	0.0431	-0.0151	0.0043	-0.0117	0.0559	0.0024	0.6912
	il18	0.0118	0.0607	-0.0138	0.0761	-0.0183	0.0197	-0.0036	0.6820	0.0007	0.9168
	il19	0.0003	0.9410	-0.0148	0.0655	-0.0088	0.2157	-0.0182	0.0342	-0.0044	0.5393
	il35	0.0034	0.6717	-0.0143	0.0349	-0.0181	0.0150	-0.0159	0.0969	-0.0091	0.3200
	il63	-0.0018	0.6898	-0.0143	0.0077	-0.0223	0.0003	-0.0136	0.0555	-0.0090	0.1980
	in20	-0.0070	0.1911	-0.0219	0.0043	-0.0324	0.0001	-0.0361	0.0001	-0.0240	0.0047
	in22	0.0301	0.0006	0.0083	0.4275	-0.0025	0.7988	-0.0002	0.9895	-0.0156	0.1864
	in34	0.0014	0.7831	0.0042	0.5638	-0.0010	0.8858	-0.0221	0.0033	-0.0101	0.1222
	in41	-0.0044	0.3781	-0.0178	0.0257	-0.0208	0.0048	-0.0259	0.0032	-0.0092	0.1832
	ky03	0.0088	0.2057	-0.0230	0.0038	-0.0180	0.0686	-0.0014	0.9067	-0.0113	0.1387
	ky22	-0.0009	0.9015	-0.0470	0.0001	-0.0512	0.0001	-0.0289	0.0001	-0.0171	0.0081
	ky35	0.0004	0.9540	-0.0199	0.0448	-0.0339	0.0003	0.0125	0.2247	-0.0120	0.0599
	ky38	0.0216	0.0295	-0.0082	0.3705	-0.0192	0.0218	0.0046	0.6210	-0.0036	0.7001
	ma01	0.0116	0.1974	-0.0068	0.2261	-0.0015	0.8667	-0.0052	0.5648	0.0006	0.9511
	ma08	0.0118	0.2197	-0.0162	0.0486	-0.0201	0.0092	-0.0129	0.1738	-0.0018	0.8426
	ma13	0.0120	0.0940	-0.0045	0.5339	-0.0187	0.0068	-0.0026	0.7335	-0.0060	0.4281
	md03	0.0152	0.0302	-0.0213	0.0083	-0.0325	0.0011	-0.0171	0.0934	-0.0212	0.0370
	md13	0.0039	0.5317	-0.0197	0.0009	-0.0218	0.0016	-0.0106	0.1391	-0.0076	0.2479
	me00	0.0087	0.2405	-0.0115	0.0613	-0.0426	0.0001	-0.0221	0.0052	-0.0107	0.1128
	me02	0.0178	0.0547	-0.0106	0.1152	-0.0305	0.0010	0.0064	0.6001	-0.0157	0.1176
	me09	0.0048	0.6070	-0.0216	0.0030	-0.0338	0.0001	-0.0156	0.0402	-0.0069	0.3542
	mi09	-0.0005	0.9356	-0.0100	0.1943	-0.0218	0.0028	-0.0183	0.0132	-0.0052	0.3610
	mi26	0.0003	0.9455	-0.0143	0.0419	-0.0202	0.0053	-0.0082	0.1839	-0.0089	0.1961
	mi53	0.0098	0.1045	-0.0072	0.2662	-0.0112	0.1229	-0.0152	0.0323	-0.0009	0.8820
	mi98	0.0049	0.5931	-0.0131	0.1444	-0.0254	0.0025	-0.0068	0.4334	-0.0145	0.0634
	mi99	0.0069	0.2860	-0.0150	0.0201	-0.0320	0.0001	-0.0256	0.0007	-0.0154	0.0164
	nh02	0.0053	0.4930	-0.0184	0.0067	-0.0302	0.0001	-0.0167	0.0157	-0.0063	0.3943
	nj99	0.0132	0.0981	-0.0190	0.0027	-0.0261	0.0001	-0.0248	0.0020	-0.0054	0.4465
	ny08	0.0008	0.8662	-0.0186	0.0068	-0.0317	0.0001	-0.0315	0.0001	-0.0114	0.0760
	ny10	-0.0109	0.0405	-0.0188	0.0040	-0.0281	0.0001	-0.0544	0.0001	-0.0202	0.0050
	ny20	0.0018	0.7546	-0.0230	0.0007	-0.0407	0.0001	-0.0357	0.0001	-0.0127	0.0716
	ny52	-0.0011	0.8286	-0.0164	0.0095	-0.0263	0.0001	-0.0307	0.0001	-0.0142	0.0059
	ny65	0.0044	0.4561	-0.0176	0.0169	-0.0366	0.0001	-0.0233	0.0012	-0.0154	0.0177
	ny68	0.0135	0.1328	-0.0091	0.2194	-0.0246	0.0072	0.0010	0.9294	0.0018	0.8498
	ny98	-0.0035	0.6568	-0.0157	0.0361	-0.0365	0.0001	-0.0044	0.6554	-0.0015	0.8364
	ny99	0.0056	0.5701	-0.0174	0.0192	-0.0248	0.0018	0.0011	0.9232	-0.0057	0.5460
	oh09	0.0092	0.2388	-0.0036	0.6630	-0.0151	0.0555	0.0188	0.0847	-0.0024	0.7873
	oh17	0.0072	0.1942	-0.0182	0.0054	-0.0225	0.0007	-0.0058	0.5138	-0.0063	0.3298
	oh49	0.0010	0.8654	-0.0134	0.0357	-0.0224	0.0010	-0.0005	0.9661	-0.0062	0.4210
	oh71	-0.0005	0.9278	-0.0094	0.1462	-0.0173	0.0115	-0.0120	0.0811	-0.0014	0.8269
	pa15	-0.0023	0.7006	-0.0247	0.0001	-0.0321	0.0001	-0.0137	0.1502	-0.0154	0.0144
	pa29	-0.0006	0.9039	-0.0097	0.1080	-0.0223	0.0004	-0.0017	0.8473	-0.0067	0.2011
	pa42	-0.0039	0.4734	-0.0154	0.0119	-0.0265	0.0001	-0.0242	0.0216	-0.0141	0.0269
	pa72	0.0037	0.6901	-0.0211	0.0029	-0.0257	0.0017	-0.0303	0.0013	-0.0023	0.7895
	va00	0.0025	0.7440	-0.0199	0.0286	-0.0227	0.0117	-0.0292	0.0080	-0.0003	0.9766
	va13	0.0093	0.1929	-0.0150	0.0423	-0.0295	0.0003	-0.0022	0.8733	-0.0071	0.2669
	va28	0.0013	0.8662	-0.0238	0.0078	-0.0417	0.0001	-0.0144	0.1313	-0.0221	0.0246
	vt01	0.0045	0.5677	-0.0029	0.6224	-0.0219	0.0003	-0.0171	0.0440	0.0038	0.5971
	vt99	0.0059	0.5037	-0.0113	0.1288	-0.0348	0.0001	-0.0049	0.5748	0.0003	0.9615
	wi28	-0.0024	0.6708	-0.0228	0.0079	-0.0308	0.0004	-0.0314	0.0002	-0.0141	0.0312
	wi36	0.0068	0.4998	-0.0187	0.0335	-0.0316	0.0016	-0.0283	0.0038	-0.0153	0.1055
	wi37	0.0010	0.8972	-0.0113	0.1306	-0.0267	0.0020	-0.0351	0.0005	-0.0142	0.0459
	wi99	0.0003	0.9718	-0.0165	0.0386	-0.0191	0.0238	-0.0148	0.2346	-0.0143	0.0755
	wv04	-0.0069	0.3577	-0.0300	0.0001	-0.0433	0.0001	-0.0332	0.0001	-0.0215	0.0001
	wv18	0.0070	0.2133	-0.0069	0.1047	-0.0257	0.0001	-0.0135	0.0179	-0.0083	0.0813
SE	al10	-0.0118	0.1937	-0.0391	0.0001	-0.0314	0.0001	-0.0265	0.0024	-0.0146	0.0371
	al99	0.0083	0.3864	-0.0190	0.0695	-0.0205	0.0346	-0.0113	0.3649	-0.0002	0.9845
	fl03	0.0064	0.4598	-0.0182	0.0054	-0.0187	0.0057	-0.0320	0.0001	-0.0075	0.2911
	fl11	0.0267	0.0447	-0.0091	0.2255	0.0027	0.6452	0.0102	0.3286	0.0059	0.3199
	fl14	-0.0003	0.9835	-0.0233	0.0144	-0.0105	0.2686	-0.0030	0.7989	0.0065	0.5816
	fl41	0.0141	0.1903	-0.0144	0.0728	-0.0144	0.0655	-0.0175	0.0749	-0.0043	0.5757
	ga20	0.0057	0.5612	-0.0297	0.0002	-0.0127	0.1054	0.0056	0.7046	0.0040	0.6438
	ga41	0.0055	0.5248	-0.0355	0.0001	-0.0293	0.0001	-0.0048	0.7439	-0.0138	0.0279
	ga50	0.0070	0.5915	-0.0271	0.0029	-0.0143	0.0638	0.0005	0.9793	-0.0085	0.2774
	ms10	0.0101	0.3477	-0.0165	0.0563	-0.0212	0.0090	-0.0264	0.0396	-0.0122	0.0889
	ms30	0.0038	0.7288	-0.0099	0.2497	-0.0249	0.0038	-0.0231	0.0538	-0.0149	0.1713
	nc03	0.0062	0.4652	-0.0302	0.0001	-0.0207	0.0023	-0.0117	0.1708	-0.0101	0.1764
	nc25	-0.0086	0.2272	-0.0309	0.0001	-0.0236	0.0048	-0.0137	0.1200	-0.0018	0.8236
	nc34	-0.0037	0.6407	-0.0281	0.0002	-0.0204	0.0038	-0.0115	0.3963	0.0050	0.5324
	nc36	0.0210	0.0207	-0.0098	0.1338	-0.0096	0.1573	-0.0108	0.0787	0.0043	0.5600
	nc41	0.0132	0.1178	-0.0275	0.0001	-0.0212	0.0030	-0.0023	0.8442	-0.0100	0.1915
	sc06	0.0309	0.0099	-0.0107	0.2185	0.0023	0.8229	0.0374	0.0489	-0.0013	0.9060
	tn00	0.0064	0.2939	-0.0350	0.0001	-0.0445	0.0001	-0.0267	0.0003	-0.0137	0.0373
	tn11	-0.0090	0.2227	-0.0277	0.0002	-0.0430	0.0001	-0.0413	0.0001	-0.0061	0.3420
	tn14	0.0171	0.0300	-0.0016	0.8461	-0.0227	0.0029	-0.0066	0.4436	-0.0103	0.2106

Table A.3 (continued).

Region	Site	Ammonium		Calcium		Magnesium		Potassium		Sodium	
		b_{year}	p	b_{year}	p	b_{year}	p	b_{year}	p	b_{year}	p
West	ak03	0.0097	0.2275	-0.0210	0.0867	-0.0372	0.0008	-0.0201	0.1431	-0.0093	0.4392
	ar02	0.0065	0.3827	-0.0207	0.0016	-0.0101	0.0593	0.0023	0.8260	0.0081	0.1935
	ar03	0.0102	0.1434	-0.0074	0.3635	-0.0086	0.2220	0.0180	0.0431	0.0030	0.7039
	ar16	-0.0052	0.4459	-0.0275	0.0020	-0.0267	0.0001	-0.0148	0.1001	-0.0096	0.1166
	ar27	-0.0046	0.5250	-0.0208	0.0023	-0.0200	0.0016	-0.0056	0.5880	-0.0101	0.1059
	az03	0.0162	0.0922	-0.0226	0.0668	-0.0273	0.0232	-0.0214	0.0514	-0.0168	0.1175
	az06	-0.0066	0.5281	-0.0087	0.5577	-0.0145	0.2909	-0.0070	0.6017	-0.0042	0.7732
	az99	0.0136	0.2219	-0.0017	0.9038	-0.0277	0.0103	0.0002	0.9855	0.0005	0.9694
	ca42	-0.0050	0.7201	-0.0312	0.0388	-0.0287	0.0611	-0.0313	0.0463	-0.0040	0.7908
	ca45	0.0164	0.1781	-0.0362	0.0001	-0.0324	0.0004	-0.0326	0.0002	-0.0150	0.1392
	ca75	0.0282	0.1232	-0.0152	0.2696	-0.0310	0.0030	-0.0164	0.1871	-0.0110	0.3652
	ca88	0.0129	0.0435	-0.0364	0.0017	-0.0303	0.0145	-0.0178	0.2434	-0.0139	0.2724
	ca98	0.0030	0.8894	-0.0536	0.0009	-0.0606	0.0004	-0.0176	0.3459	-0.0306	0.0637
	ca99	0.0120	0.3688	-0.0246	0.0576	-0.0318	0.0036	-0.0193	0.1719	-0.0196	0.1593
	co00	0.0082	0.4121	-0.0320	0.0113	-0.0533	0.0001	-0.0272	0.0429	-0.0215	0.0648
	co01	0.0234	0.0300	-0.0109	0.3585	-0.0286	0.0177	-0.0269	0.0660	-0.0090	0.4227
	co02	0.0305	0.0771	-0.0066	0.5523	-0.0187	0.0906	-0.0225	0.0897	-0.0130	0.3382
	co15	0.0142	0.1051	-0.0233	0.0326	-0.0364	0.0004	-0.0256	0.0110	-0.0214	0.0366
	co19	0.0180	0.0465	-0.0134	0.1204	-0.0381	0.0002	-0.0094	0.4850	-0.0213	0.0193
	co21	0.0234	0.0093	-0.0151	0.0820	-0.0361	0.0001	-0.0335	0.0019	-0.0127	0.1542
	co22	0.0046	0.5306	-0.0279	0.0024	-0.0515	0.0001	-0.0180	0.1107	-0.0277	0.0185
	co97	0.0467	0.0001	0.0062	0.6337	-0.0172	0.1693	0.0077	0.5319	0.0141	0.3586
	co98	-0.0013	0.8761	-0.0293	0.0011	-0.0424	0.0001	-0.0237	0.0189	-0.0136	0.1570
	co99	0.0086	0.3675	-0.0147	0.2165	-0.0211	0.0392	-0.0189	0.0372	-0.0043	0.5672
	ia08	0.0201	0.0164	0.0016	0.8480	-0.0019	0.8130	-0.0083	0.5353	-0.0064	0.4443
	ia23	0.0315	0.0004	-0.0021	0.8575	-0.0118	0.2881	-0.0081	0.4989	-0.0069	0.4131
	id03	0.0360	0.0025	-0.0239	0.0771	-0.0412	0.0020	-0.0292	0.0366	-0.0167	0.2168
	id11	0.0364	0.0022	-0.0071	0.6023	-0.0302	0.0197	-0.0092	0.4776	0.0102	0.5260
	id15	0.0338	0.0061	0.0062	0.6534	-0.0027	0.8377	0.0134	0.2825	0.0062	0.6562
	ks07	0.0142	0.0811	-0.0064	0.4658	-0.0224	0.0074	-0.0242	0.0864	-0.0147	0.0795
	ks31	0.0128	0.0197	-0.0019	0.8022	-0.0172	0.0223	-0.0121	0.1920	-0.0113	0.1651
	ks32	0.0234	0.0057	-0.0011	0.9298	-0.0230	0.0525	-0.0142	0.2298	-0.0094	0.3746
	la12	-0.0010	0.9157	-0.0097	0.1033	-0.0147	0.0124	-0.0162	0.0479	-0.0107	0.0992
	la30	-0.0101	0.2013	-0.0262	0.0012	-0.0213	0.0029	-0.0213	0.0062	-0.0115	0.1094
	mn16	-0.0096	0.2967	-0.0206	0.0054	-0.0264	0.0008	-0.0272	0.0024	-0.0303	0.0001
	mn18	-0.0016	0.8589	-0.0275	0.0001	-0.0472	0.0001	-0.0428	0.0001	-0.0312	0.0001
	mn23	0.0197	0.0280	-0.0085	0.3770	-0.0164	0.1088	-0.0188	0.0557	-0.0085	0.4652
	mn27	-0.0013	0.8649	-0.0208	0.0070	-0.0322	0.0001	-0.0278	0.0016	-0.0206	0.0048
	mo03	0.0017	0.7621	-0.0147	0.0555	-0.0166	0.0313	-0.0234	0.0025	-0.0092	0.2708
	mo05	0.0035	0.5319	-0.0232	0.0021	-0.0281	0.0002	-0.0134	0.1696	-0.0091	0.1744
	mt00	0.0322	0.0019	-0.0188	0.0930	-0.0383	0.0014	-0.0187	0.1662	-0.0228	0.1322
	mt05	0.0087	0.3031	-0.0224	0.0039	-0.0354	0.0001	-0.0110	0.1666	-0.0131	0.0544
	mt07	0.0136	0.1759	-0.0151	0.0981	-0.0502	0.0001	-0.0301	0.0057	-0.0286	0.0039
	mt13	0.0274	0.0475	-0.0297	0.0728	-0.0446	0.0138	-0.0351	0.0054	-0.0093	0.3456
	nd07	0.0004	0.9696	-0.0224	0.0454	-0.0246	0.0409	-0.0192	0.1072	-0.0122	0.2919
	nd08	0.0138	0.1810	-0.0196	0.0420	-0.0164	0.1259	-0.0115	0.3738	-0.0165	0.1469
	nd11	0.0143	0.2633	-0.0219	0.0737	-0.0379	0.0068	-0.0352	0.0041	-0.0335	0.0172
	ne15	0.0009	0.8801	-0.0079	0.2113	-0.0216	0.0032	-0.0155	0.0357	-0.0157	0.0580
	nm07	0.0097	0.2541	-0.0246	0.0030	-0.0437	0.0001	-0.0504	0.0001	-0.0350	0.0001
	nm08	0.0305	0.0179	-0.0054	0.6810	-0.0291	0.0382	-0.0201	0.0878	-0.0245	0.1448
	nm09	0.0137	0.1313	-0.0231	0.0271	-0.0412	0.0001	-0.0285	0.0039	-0.0163	0.0426
	nm12	0.0569	0.0022	-0.0010	0.9473	-0.0345	0.0290	0.0106	0.6078	0.0064	0.6981
	ok00	0.0118	0.2010	-0.0232	0.0664	-0.0375	0.0012	-0.0086	0.4362	-0.0295	0.0066
	ok17	0.0016	0.8419	-0.0079	0.4207	-0.0109	0.2265	0.0166	0.2099	-0.0066	0.4928
	or02	0.0121	0.0772	-0.0217	0.0104	-0.0230	0.0243	-0.0136	0.1897	-0.0181	0.0964
	or09	0.0366	0.0075	-0.0140	0.2809	-0.0298	0.0322	-0.0606	0.0006	-0.0305	0.0408
	or10	0.0045	0.5343	-0.0316	0.0001	-0.0281	0.0022	-0.0210	0.0028	-0.0117	0.1769
	or18	0.0351	0.0053	-0.0271	0.0324	-0.0385	0.0009	-0.0153	0.2024	-0.0132	0.2308
	or97	0.0364	0.0002	-0.0271	0.0003	-0.0196	0.0230	-0.0088	0.2992	-0.0021	0.8083
	or98	0.0245	0.0029	-0.0125	0.0184	-0.0133	0.0666	-0.0038	0.6313	-0.0031	0.6674
	sd08	0.0072	0.5739	-0.0184	0.1256	-0.0362	0.0085	-0.0324	0.0185	-0.0095	0.4199
	sd99	0.0158	0.0683	-0.0083	0.3909	-0.0141	0.0951	-0.0165	0.1315	-0.0027	0.7447
	tx03	0.0256	0.0534	-0.0168	0.1650	-0.0100	0.2473	-0.0010	0.9156	-0.0040	0.6466
	tx04	0.0231	0.0642	-0.0073	0.6298	-0.0308	0.0017	-0.0120	0.3817	-0.0022	0.8383
	tx10	0.0174	0.1183	-0.0233	0.0526	-0.0189	0.0451	0.0053	0.5786	-0.0099	0.3052
	tx16	0.0268	0.0392	0.0141	0.3101	-0.0056	0.6321	0.0053	0.6303	0.0066	0.5398
	tx21	-0.0053	0.4456	-0.0246	0.0009	-0.0204	0.0011	-0.0104	0.3355	-0.0111	0.0896
	tx22	0.0305	0.0045	0.0164	0.2739	-0.0030	0.8056	0.0123	0.3361	-0.0010	0.9376
	tx38	-0.0058	0.3922	-0.0283	0.0028	-0.0283	0.0001	-0.0282	0.0118	-0.0194	0.0033
	tx56	0.0122	0.1954	-0.0229	0.0286	-0.0306	0.0018	-0.0192	0.1535	-0.0241	0.0248
	ut01	0.0140	0.1268	0.0032	0.8287	-0.0098	0.4750	-0.0116	0.2582	-0.0063	0.7102
	wa14	0.0037	0.2690	-0.0218	0.0035	-0.0133	0.1546	-0.0092	0.2263	-0.0009	0.9239
	wa19	0.0218	0.0416	-0.0257	0.0096	-0.0358	0.0028	-0.0000	0.9979	-0.0019	0.8725
	wa21	0.0222	0.0830	-0.0412	0.0001	-0.0516	0.0001	-0.0073	0.5036	-0.0389	0.0010
	wy02	0.0074	0.5117	-0.0383	0.0013	-0.0616	0.0001	-0.0340	0.0010	-0.0344	0.0070
	wy06	0.0222	0.0291	-0.0192	0.1452	-0.0442	0.0018	-0.0325	0.0186	-0.0188	0.0994
	wy08	0.0367	0.0004	0.0042	0.7450	-0.0200	0.0793	-0.0161	0.1091	0.0106	0.3529
	wy99	0.0130	0.1780	-0.0143	0.0610	-0.0392	0.0001	-0.0266	0.0016	-0.0358	0.0019

Table A.4. Estimated changes in concentrations (μeq/L and percent) of individual ions in precipitation from 1983 through 1994.

Region	Site	Hydrogen Ion		Sulfate		Nitrate		Chloride	
		Change (μeq/L)	Percent Change	Change (μeq/L)	Percent Change	Change (μeq/L)	Percent Change	Change (μeq/L)	Percent Change
NE	il11	-7.686*	-15.146	-7.399*	-12.988	0.614	2.645	-0.304	-7.999
	il18	-3.985	-11.841	-7.341	-14.694	2.502	10.677	-0.297	-8.372
	il19	-9.866*	-21.811	-11.533*	-18.528	-2.841	-9.851	-0.662	-12.516
	il35	2.767	7.652	-4.951	-11.514	-0.483	-2.725	-0.434	-9.467
	il63	0.376	0.918	-6.282*	-12.542	0.453	2.477	-0.417	-7.845
	in20	-4.035	-8.281	-15.255*	-24.788	-2.623	-9.024	-1.348*	-30.916
	in22	-0.512	-1.087	4.127	7.892	6.584*	38.812	-0.862	-15.839
	in34	-10.301*	-24.467	-7.957*	-13.028	-0.582	-2.099	-0.548	-10.859
	in41	-8.060*	-16.298	-9.104*	-15.201	-3.538	-12.701	-1.183*	-26.376
	ky03	-3.520	-8.022	-2.112	-4.687	0.300	1.643	-0.926	-21.075
	ky22	-6.620*	-16.509	-10.151*	-24.279	-3.374*	-17.747	-1.683*	-42.701
	ky35	-7.343	-15.074	-6.359	-12.972	-4.606	-20.336	-0.858*	-23.836
	ky38	-1.938	-5.723	-2.689	-7.176	1.371	8.766	-0.189	-4.259
	ma01	5.106	16.724	-0.897	-2.464	4.663	32.617	0.014	0.018
	ma08	-4.251	-9.625	-8.162	-20.377	-0.525	-2.401	-1.042	-14.949
	ma13	-10.129*	-19.810	-6.033	-12.854	1.974	11.324	-5.008*	-26.769
	md03	-0.578	-0.992	-2.749	-5.012	-0.361	-1.335	-2.241	-26.317
	md13	-5.303	-10.354	-5.893	-11.846	-1.802	-7.533	-2.262	-17.265
	me00	-4.764	-15.680	-4.307	-14.859	1.987	14.214	-0.962	-21.648
	me02	1.368	4.221	-2.525	-8.417	3.982	30.197	-1.056	-17.766
	me09	1.201	4.525	-1.749	-7.315	2.448	20.011	-0.592	-17.770
	mi09	-6.432*	-17.506	-8.165*	-20.477	-0.722	-2.755	-0.412	-14.961
	mi26	-8.570*	-19.196	-13.327*	-25.085	-2.917	-10.155	-0.675*	-16.933
	mi53	-8.420*	-20.803	-6.702*	-15.067	0.039	0.129	-0.624	-16.456
	mi98	-10.775*	-28.061	-10.626*	-26.188	-2.387	-9.054	-0.621*	-21.717
	mi99	-2.909	-13.226	-5.725*	-20.057	1.018	5.908	-0.680*	-25.718
	nh02	-2.791	-6.397	-4.967	-13.535	1.505	7.255	-0.572	-14.216
	nj99	-3.318	-6.798	-0.765	-1.668	0.764	3.339	-1.511	-13.467
	ny08	-9.416*	-14.354	-7.970	-12.598	-2.883	-8.736	-0.914*	-21.282
	ny10	-10.530*	-16.301	-17.690*	-27.125	-1.567	-4.840	-1.610*	-31.584
	ny20	-1.749	-4.049	-5.130	-13.523	-0.957	-4.208	-0.898*	-30.867
	ny52	-10.207*	-16.442	-10.778*	-18.542	-3.510	-9.759	-1.441*	-28.898
	ny65	1.053	1.965	-2.843	-5.709	0.734	2.925	-0.321	-10.548
	ny68	1.520	3.147	-2.342	-5.447	1.944	8.287	-0.204	-5.117
	ny98	-9.057*	-20.861	-10.998*	-26.653	-2.680	-12.646	-0.421	-19.200
	ny99	-5.387	-9.590	-7.092	-14.591	-3.960	-14.863	1.353	13.360
	oh09	-6.053	-10.329	-6.832	-11.075	-1.333	-5.438	-0.248	-6.085
	oh17	-0.969	-1.710	-2.545	-4.120	0.666	2.279	-0.176	-4.294
	oh49	-0.756	-1.105	-2.783	-3.974	1.829	6.616	-0.372	-7.350
	oh71	-4.392	-7.443	-4.850	-7.544	-1.437	-4.825	-0.507	-11.768
	pa15	-14.989*	-21.166	-12.499*	-19.872	-6.720*	-20.746	-1.129*	-22.594
	pa29	-9.636*	-14.013	-7.594	-12.269	-1.536	-5.188	-0.607	-14.294
	pa42	-8.500	-12.824	-10.300	-17.041	-4.143	-13.111	-0.582	-11.965
	pa72	-9.461	-15.924	-10.793	-20.984	-3.281	-11.338	-1.407	-20.722
	va00	-7.214	-13.640	-5.626	-11.670	-4.515	-17.906	-0.266	-4.484
	va13	2.911	8.700	0.358	0.979	1.975	12.522	-0.637	-16.887
	va28	-7.092*	-20.044	-9.270*	-25.231	-2.978	-19.344	-1.744*	-40.299
	vt01	8.432	20.283	2.704	6.920	5.932*	27.040	0.006	0.156
	vt99	-1.224	-2.814	-1.919	-5.069	1.305	5.476	-0.285	-11.520
	wi28	-11.771*	-42.646	-15.264*	-36.309	-3.314	-13.128	-1.065*	-31.059
	wi36	-4.346	-21.102	-7.405*	-26.619	0.809	4.394	-0.490*	-22.549
	wi37	-3.601	-21.947	-8.438*	-28.470	0.106	0.513	-0.708*	-26.963
	wi99	-4.221	-12.110	-10.748*	-21.866	-0.767	-2.828	-1.298*	-30.946
	wv04	-9.779*	-20.006	-14.136*	-29.762	-2.738	-13.023	-1.051*	-29.310
	wv18	4.110	7.389	1.295	2.346	1.465	5.885	-0.526*	-14.401
SE	al10	2.143	9.984	-5.903*	-20.977	-1.290	-10.714	-2.055	-23.655
	al99	-5.991	-18.741	-9.508	-24.084	0.653	5.054	-0.485	-8.509
	fl03	1.497	6.931	-0.609	-2.593	2.710	28.850	-3.351	-19.705
	fl11	0.237	2.634	-0.547	-3.498	1.821	29.430	4.736	14.864
	fl14	-1.789	-9.171	-1.232	-6.621	0.994	12.287	-1.292	-10.509
	fl41	2.449	16.627	-1.530	-7.376	1.457	14.562	-2.252	-11.308
	ga20	-4.463	-19.522	-4.582	-18.508	0.851	8.333	-0.435	-4.228
	ga41	-1.391	-5.184	-4.791	-15.644	-0.924	-7.665	-2.242*	-28.732
	ga50	2.191	13.005	-2.074	-10.257	1.138	12.498	-1.729	-17.618
	ms10	-1.659	-8.801	-7.330*	-28.084	-0.567	-4.808	-1.851	-22.186
	ms30	-3.798	-17.237	-8.083*	-32.691	-1.598	-13.303	-0.966	-14.970
	nc03	-4.601	-14.697	-7.455*	-21.790	-1.600	-10.566	-2.833	-19.753
	nc25	-3.844	-13.803	-7.943*	-25.356	-1.415	-12.123	-0.652	-13.166
	nc34	-1.488	-3.952	-2.208	-5.265	-1.237	-6.805	-0.122	-1.796
	nc36	8.063*	28.991	5.665	20.077	4.986*	39.317	0.604	6.240
	nc41	-6.281	-20.078	-6.814	-19.045	-1.891	-11.698	-2.595	-24.568
	sc06	-3.544	-12.182	-6.800	-20.781	1.662	15.666	-0.283	-2.198
	tn00	-2.485	-5.240	-9.982*	-19.532	-0.920	-5.246	-1.490*	-25.053
	tn11	-1.085	-3.348	-4.202	-12.141	-1.175	-7.904	-0.633	-18.836
	tn14	2.792	12.875	1.594	6.843	3.049*	26.288	-1.220	-23.820

* Annual trend was significant ($p<0.05$).

Table A.4 (continued).

Region	Site	Hydrogen Ion Change (µeq/L)	Hydrogen Ion Percent Change	Sulfate Change (µeq/L)	Sulfate Percent Change	Nitrate Change (µeq/L)	Nitrate Percent Change	Chloride Change (µeq/L)	Chloride Percent Change
West	ak03	-1.022	-14.915	-1.370	-30.398	1.123*	83.978	-0.214	-9.961
	ar02	1.255	8.259	-3.770	-15.253	0.569	4.656	0.373	5.956
	ar03	-2.009	-8.834	-3.448	-12.736	-0.792	-5.524	0.041	0.690
	ar16	1.508	7.933	-2.019	-7.981	0.113	0.845	-0.837*	-18.896
	ar27	-2.622	-19.467	-6.637*	-24.419	-1.073	-7.159	-0.596	-13.228
	az03	-0.940	-13.464	-6.973*	-38.732	0.922	6.923	-1.160	-26.798
	az06	-0.495	-6.783	-5.676	-23.647	-2.856	-15.509	-1.780	-8.939
	az99	-10.822*	-53.165	-14.347*	-45.606	-0.349	-2.847	-0.249	-6.200
	ca42	-11.358*	-53.773	-8.851*	-37.800	-9.304	-27.569	-2.210	-16.163
	ca45	-1.368*	-26.118	-2.668*	-39.510	1.276	34.085	-3.589	-31.664
	ca75	-2.200*	-45.562	-3.530	-27.754	4.507	31.240	-1.262	-29.208
	ca88	-0.780*	-41.635	-4.862*	-24.974	0.496	2.289	-1.824	-19.206
	ca98	-4.293	-40.056	-8.858*	-52.688	-4.668	-24.167	-3.388*	-50.924
	ca99	-1.280	-16.603	-3.463	-30.993	1.267	8.220	-0.681	-16.069
	co00	-1.490	-23.973	-5.813*	-32.143	-1.567	-14.234	-1.304*	-39.688
	co01	-2.173*	-46.153	-1.036	-5.717	-1.227	-6.269	-1.196	-31.578
	co02	0.335	2.833	0.020	0.153	5.417*	50.805	-0.349	-14.023
	co15	-0.334	-2.883	-3.255	-18.829	1.818	12.954	-0.849*	-27.540
	co19	-1.013	-9.279	-5.052*	-30.500	3.841*	26.347	-0.335	-12.519
	co21	0.273	1.959	-2.449	-15.214	2.670	14.997	-0.614*	-24.087
	co22	-3.206*	-37.967	-5.681*	-30.530	-1.897	-9.519	-0.910*	-31.359
	co97	1.221	8.901	4.472*	33.368	6.188*	89.920	0.331	20.233
	co98	-1.888	-16.570	-4.954*	-33.894	-0.101	-0.904	-0.733*	-29.766
	co99	-3.770	-23.072	-4.950*	-20.925	0.772	5.251	-0.312	-11.563
	ia08	2.591	19.465	-2.419	-6.566	4.958	23.033	-0.559	-18.285
	ia23	-5.167	-29.378	-6.180	-18.327	5.239	30.921	-0.378	-12.636
	id03	-0.252	-4.943	-3.098	-25.400	3.543	37.135	-1.609*	-33.508
	id11	-2.666*	-44.656	0.068	0.781	5.569*	67.397	-0.566	-15.050
	id15	-1.878	-28.189	-0.812	-13.771	2.013*	33.745	-0.196	-8.960
	ks07	-2.295	-12.816	-5.060	-16.436	0.273	1.643	-1.342*	-31.547
	ks31	-2.643	-18.426	-1.482	-5.396	2.627	13.603	-0.479	-14.458
	ks32	-1.086	-23.241	-1.124	-5.930	5.625*	35.999	-0.636	-22.278
	la12	-0.949	-5.888	-4.621*	-19.368	-0.716	-5.964	-3.431	-18.502
	la30	1.573	9.314	-4.821*	-19.437	-0.972	-7.885	-3.627*	-25.201
	mn16	-4.450	-29.933	-10.654*	-42.126	-2.785	-14.456	-1.107*	-42.338
	mn18	-0.302	-2.212	-4.730*	-24.123	-0.128	-0.849	-0.683*	-33.065
	mn23	-0.520	-5.654	-2.678	-13.208	2.781	16.302	-0.158	-8.031
	mn27	-1.796	-24.658	-9.767*	-31.578	-2.583	-10.399	-1.274*	-38.745
	mo03	-7.190*	-26.516	-10.297*	-27.416	-1.873	-9.394	-0.696*	-18.475
	mo05	-1.947	-6.750	-4.775	-13.682	-0.911	-5.108	-0.791	-16.930
	mt00	-0.354	-4.459	-2.615	-17.484	1.717	16.942	-0.973*	-35.923
	mt05	-0.734	-8.229	-2.424*	-26.097	0.579	9.978	-0.830*	-39.579
	mt07	0.034	0.399	-1.999	-19.297	1.351	20.739	-0.833*	-35.492
	mt13	-1.504	-19.481	-0.118	-0.583	2.579	21.649	-1.044*	-35.820
	nd07	-2.101	-22.814	-6.035*	-28.930	-0.923	-6.725	-0.820*	-33.175
	nd08	-1.248	-19.054	-3.521	-18.105	0.287	1.664	-0.630	-24.361
	nd11	-1.370	-26.814	-8.990*	-32.615	-4.593	-17.776	-1.135*	-35.893
	ne15	-3.747*	-45.079	-7.262*	-20.967	1.375	6.472	-0.943*	-30.323
	nm07	-1.156	-9.489	-5.616*	-29.176	-0.002	-0.016	-1.477*	-45.922
	nm08	-3.507*	-38.893	-4.793	-23.604	1.336	14.364	-1.067	-31.244
	nm09	-4.021*	-27.596	-5.412*	-28.396	-0.533	-4.051	-1.028*	-32.435
	nm12	-2.223	-25.067	2.855	23.329	10.544*	173.269	-0.970	-30.587
	ok00	-1.164	-11.527	-4.835	-17.999	-0.117	-0.606	-3.205*	-44.679
	ok17	-1.348	-12.237	-6.101	-23.088	-0.509	-3.178	-1.881*	-34.658
	or02	-0.936	-16.976	-2.351*	-28.856	1.114*	72.324	-10.162	-30.627
	or09	-1.233	-14.897	-0.191	-3.497	3.604*	74.343	-2.107*	-54.711
	or10	-0.438	-6.924	-1.746*	-31.201	1.315*	50.277	-2.088	-26.522
	or18	-2.900*	-31.972	-0.353	-7.570	2.003	43.798	-0.608*	-28.563
	or97	-1.660*	-28.635	-2.293*	-26.831	1.277*	34.775	-1.433	-9.597
	or98	-1.266	-14.949	-1.718*	-17.859	0.792	14.884	-1.298	-9.086
	sd08	-1.409	-18.721	-4.149	-26.274	-0.207	-1.483	-0.704*	-29.630
	sd99	-4.137*	-63.535	-6.430	-27.994	-0.973	-5.266	-0.508	-20.043
	tx03	2.599	25.544	-0.924	-3.236	1.068	8.012	-2.955	-12.219
	tx04	-0.453	-10.481	3.092	15.899	5.192*	60.543	-0.441	-12.040
	tx10	2.363	17.542	-0.134	-0.619	1.858	16.316	-4.164	-22.374
	tx16	-1.950	-25.040	2.236	10.662	2.542	25.366	0.927	16.333
	tx21	-0.593	-2.552	-4.388	-13.416	-1.258	-8.857	-2.122	-22.090
	tx22	-4.042*	-46.559	-0.761	-3.237	5.074*	56.706	-0.019	-0.644
	tx38	1.221	8.412	-4.675	-18.205	-0.266	-2.226	-3.939*	-33.442
	tx56	-0.330	-3.287	-5.151	-19.739	0.558	3.882	-2.310*	-32.595
	ut01	-1.703*	-76.230	-2.355	-13.422	0.563	3.662	-4.906	-32.675
	wa14	-0.773	-12.900	-0.869	-15.425	0.864*	77.984	-3.469	-16.795
	wa19	-3.779*	-29.212	-2.347	-25.188	1.733	35.108	-1.652	-25.456
	wa21	-2.120	-14.526	-3.788	-25.376	1.028	18.366	-7.923*	-57.686
	wy02	-4.968*	-42.674	-9.021*	-51.257	-0.740	-7.125	-2.037*	-58.345
	wy06	1.099	12.152	-2.555	-17.916	3.794*	37.058	-1.066*	-30.218
	wy08	-2.397*	-35.271	0.911	12.282	3.876*	69.203	-0.504	-18.702
	wy99	-1.812	-20.584	-4.699*	-26.039	0.157	1.137	-0.997*	-37.450

* Annual trend was significant ($p<0.05$).

Table A.4 (continued).

Region	Site	Ammonium Change (µeq/L)	Ammonium Percent Change	Calcium Change (µeq/L)	Calcium Percent Change	Magnesium Change (µeq/L)	Magnesium Percent Change	Potassium Change (µeq/L)	Potassium Percent Change	Sodium Change (µeq/L)	Sodium Percent Change
NE	il11	4.674*	27.414	-2.387*	-23.531	-0.615*	-26.888	-0.102	-21.469	0.118	5.102
	il18	5.905	27.732	-3.194	-24.840	-1.302*	-31.609	-0.043	-7.140	0.035	1.395
	il19	0.158	0.699	-4.139	-26.478	-0.888	-16.701	-0.232*	-31.375	-0.305	-8.764
	il35	0.868	7.234	-2.127*	-25.698	-0.638*	-31.277	-0.149	-28.119	-0.566	-17.113
	il63	-0.526	-3.614	-2.185*	-25.717	-0.786*	-37.004	-0.158	-24.569	-0.651	-17.027
	in20	-3.023	-13.513	-4.268*	-36.526	-1.961*	-48.948	-0.325*	-52.647	-1.252*	-39.147
	in22	8.674*	86.438	1.475	18.728	-0.104	-5.015	-0.003	-0.461	-0.987	-27.560
	in34	0.628	3.019	1.669	9.177	-0.120	-2.106	-0.237*	-36.766	-0.589	-18.913
	in41	-1.937	-8.641	-3.754*	-30.817	-1.271*	-35.023	-0.257*	-41.500	-0.524	-17.423
	ky03	2.171	19.998	-2.503*	-37.977	-0.549	-31.109	-0.012	-2.859	-0.652	-20.833
	ky22	-0.145	-1.757	-6.784*	-62.241	-1.524*	-65.390	-0.243*	-45.078	-0.769*	-29.903
	ky35	0.107	0.925	-2.850*	-33.793	-1.096*	-50.500	0.177	29.617	-0.553	-22.077
	ky38	4.537*	56.345	-0.866	-15.671	-0.571*	-32.758	0.050	9.981	-0.263	-7.185
	ma01	1.570	27.261	-0.724	-13.167	-0.463	-3.007	-0.167	-10.258	0.778	1.220
	ma08	2.241	27.662	-0.827*	-28.464	-0.672*	-34.050	-0.084	-23.411	-0.176	-3.654
	ma13	1.870	28.328	-0.324	-8.912	-1.290*	-32.103	-0.027	-5.170	-1.582	-11.652
	md03	4.531*	37.156	-2.255*	-35.655	-1.385*	-49.046	-0.175	-29.797	-2.130*	-35.515
	md13	1.060	8.371	-1.610*	-33.569	-1.304*	-36.385	-0.114	-19.776	-1.453	-14.631
	me00	1.230	19.663	-0.953	-21.259	-1.023*	-58.634	-0.146*	-36.784	-0.727	-19.867
	me02	2.602	44.733	-0.492	-19.787	-0.850*	-46.891	0.050	14.192	-1.447	-27.818
	me09	0.607	10.463	-0.969*	-36.060	-0.662*	-50.336	-0.090*	-27.650	-0.361	-13.328
	mi09	-0.163	-0.959	-1.685	-18.689	-1.074*	-36.394	-0.182*	-31.617	-0.188	-10.148
	mi26	0.150	0.712	-2.620*	-25.696	-1.145*	-34.168	-0.075	-15.713	-0.430	-16.865
	mi53	4.231	22.535	-1.539	-13.873	-0.834	-20.695	-0.147*	-27.070	-0.042	-1.843
	mi98	1.861	10.658	-1.955	-23.807	-1.124*	-40.958	-0.054	-13.227	-0.556	-25.885
	mi99	1.991	15.330	-2.135*	-26.778	-1.260*	-48.488	-0.247*	-41.220	-0.655*	-27.325
	nh02	0.939	11.658	-0.960*	-31.642	-0.701*	-46.503	-0.104*	-29.191	-0.383	-12.299
	nj99	3.177	31.440	-1.576*	-32.497	-1.523*	-41.783	-0.216*	-40.173	-0.902	-10.602
	ny08	0.314	1.722	-2.286*	-31.958	-1.146*	-48.192	-0.195*	-47.981	-0.478	-21.063
	ny10	-3.869*	-20.248	-2.486*	-32.200	-1.060*	-44.090	-0.521*	-67.629	-0.976*	-34.137
	ny20	0.376	3.781	-1.735*	-37.876	-0.904*	-56.959	-0.197*	-52.294	-0.429	-23.195
	ny52	-0.426	-2.240	-2.282*	-28.817	-1.087*	-42.022	-0.312*	-47.026	-0.749*	-25.443
	ny65	1.129	9.464	-1.483*	-30.536	-0.931*	-53.182	-0.118*	-38.293	-0.554*	-27.270
	ny68	2.864	32.375	-0.570	-17.146	-0.634*	-39.878	0.007	2.126	0.096	3.858
	ny98	-0.749	-7.017	-1.087*	-27.734	-0.806*	-53.095	-0.031	-8.635	-0.041	-3.057
	ny99	1.161	12.369	-1.361*	-30.306	-1.276*	-40.175	0.011	2.300	-0.760	-11.064
	oh09	2.857	21.114	-0.491	-7.099	-0.597	-26.799	0.183	47.570	-0.125	-4.848
	oh17	2.936	16.070	-3.119*	-31.490	-1.239*	-37.316	-0.065	-11.273	-0.348	-12.305
	oh49	0.304	2.140	-2.212*	-24.180	-1.078*	-37.099	-0.007	-1.022	-0.315	-12.103
	oh71	-0.209	-0.981	-1.599	-17.660	-0.857*	-30.188	-0.101	-21.977	-0.070	-2.909
	pa15	-0.626	-4.647	-2.632*	-40.102	-0.977*	-48.572	-0.113	-24.685	-0.685*	-27.393
	pa29	-0.158	-1.145	-1.043	-18.155	-0.670*	-37.015	-0.014	-3.392	-0.268	-12.984
	pa42	-1.175	-7.733	-1.653*	-27.257	-0.873*	-42.297	-0.251*	-39.487	-0.664*	-25.405
	pa72	0.779	7.871	-1.613*	-35.395	-0.925*	-41.267	-0.273*	-46.665	-0.205	-4.627
	va00	0.573	5.304	-1.398*	-33.741	-0.807*	-37.584	-0.324*	-45.391	-0.027	-0.600
	va13	1.894	21.329	-1.707*	-26.732	-1.046*	-45.720	-0.043	-4.394	-0.408	-13.750
	va28	0.282	2.805	-1.249*	-38.936	-0.869*	-57.856	-0.092	-25.859	-1.111*	-36.749
	vt01	1.075	9.732	-0.288	-5.850	-0.794*	-36.488	-0.148*	-29.853	0.232	8.135
	vt99	1.429	12.936	-0.876	-20.920	-0.806*	-51.355	-0.033	-9.622	0.011	0.659
	wi28	-1.147	-4.921	-4.743*	-37.595	-1.638*	-47.201	-0.379*	-47.855	-0.690*	-25.411
	wi36	2.104	15.145	-3.025*	-32.067	-1.266*	-48.088	-0.213*	-44.411	-0.516	-27.106
	wi37	0.455	2.185	-2.364	-20.894	-1.275*	-42.469	-0.372*	-51.688	-0.603*	-25.567
	wi99	0.140	0.605	-3.916*	-28.983	-1.438*	-32.628	-0.185	-26.339	-0.693	-25.593
	wv04	-1.344	-13.254	-2.690*	-46.311	-1.058*	-59.258	-0.344*	-49.726	-0.849*	-35.994
	wv18	1.696	15.546	-1.013	-13.406	-0.782*	-41.271	-0.144*	-24.443	-0.322	-15.786
SE	al10	-1.632	-21.745	-3.704*	-55.514	-1.286*	-47.803	-0.371*	-42.285	-2.018*	-26.042
	al99	2.090	18.816	-1.580	-32.533	-0.679*	-34.585	-0.136	-20.876	-0.018	-0.384
	fl03	0.684	14.167	-1.780*	-31.372	-1.299*	-32.161	-0.414*	-48.448	-2.126	-14.455
	fl11	2.587*	73.907	-1.173	-17.180	0.402	5.714	0.328	23.489	3.528	12.892
	fl14	-0.024	-0.555	-1.492*	-38.360	-0.589	-19.598	-0.034	-5.985	1.255	14.342
	fl41	1.652	33.927	-1.707	-25.730	-1.270	-25.854	-0.269	-30.368	-1.461	-8.555
	ga20	0.913	12.524	-2.300*	-45.920	-0.677	-23.146	0.114	12.246	0.690	8.631
	ga41	0.899	12.120	-2.375*	-52.124	-1.068*	-45.527	-0.074	-9.528	-1.601*	-24.916
	ga50	0.889	15.527	-1.942*	-42.928	-0.730	-25.636	0.010	0.948	-1.367	-16.216
	ms10	1.898	23.161	-1.355	-28.909	-0.876*	-35.528	-0.389*	-42.162	-1.670	-22.396
	ms30	0.605	8.169	-0.763	-18.502	-0.826*	-40.308	-0.303	-38.026	-1.462	-26.526
	nc03	1.166	13.630	-1.982*	-46.498	-1.330*	-34.836	-0.163	-21.583	-2.280	-18.918
	nc25	-1.389	-16.315	-1.779*	-47.294	-0.590*	-38.738	-0.141	-24.792	-0.145	-3.706
	nc34	-1.028	-7.306	-2.147*	-44.188	-0.831*	-34.526	-0.216	-21.255	0.565	10.819
	nc36	3.495*	54.497	-0.621	-18.334	-0.471	-18.002	-0.116	-20.059	0.759	9.229
	nc41	3.960	31.576	-1.718*	-43.385	-1.069*	-35.603	-0.039	-4.733	-1.612	-18.766
	sc06	3.565*	89.764	-0.977	-19.852	0.145	4.836	0.990*	116.953	-0.299	-2.756
	tn00	1.288	14.157	-3.676*	-51.601	-1.420*	-60.232	-0.272*	-42.549	-0.928*	-24.703
	tn11	-1.671	-16.984	-2.294*	-43.676	-1.090*	-58.983	-0.634*	-57.495	-0.303	-11.886
	tn14	2.990*	42.675	-0.119	-3.206	-0.658*	-37.558	-0.065	-12.828	-0.862	-19.201

* Annual trend was significant ($p<0.05$).

Table A.4 (continued).

Region	Site	Ammonium Change (µeq/L)	Ammonium Percent Change	Calcium Change (µeq/L)	Calcium Percent Change	Magnesium Change (µeq/L)	Magnesium Percent Change	Potassium Change (µeq/L)	Potassium Percent Change	Sodium Change (µeq/L)	Sodium Percent Change
West	ak03	0.328	22.307	-0.652	-35.275	-0.402*	-53.735	-0.110	-34.060	-0.272	-17.471
	ar02	1.458	14.340	-2.144*	-34.873	-0.419	-18.890	0.048	4.878	0.982	18.368
	ar03	2.088	23.465	-0.856	-14.285	-0.336	-16.402	0.276*	45.148	0.347	6.398
	ar16	-1.151	-10.280	-3.476*	-43.385	-0.865*	-42.478	-0.225	-26.454	-0.757	-18.101
	ar27	-1.447	-9.132	-3.534*	-35.058	-0.689*	-33.995	-0.082	-10.954	-0.819	-18.803
	az03	2.367	39.932	-6.629	-37.358	-2.424*	-43.227	-0.218	-35.780	-1.309	-29.331
	az06	-1.984	-12.857	-2.191	-16.500	-1.611	-25.943	-0.151	-13.495	-1.409	-8.329
	az99	2.799	32.489	-0.314	-3.428	-1.092*	-43.685	0.003	0.456	0.039	1.002
	ca42	-1.528	-9.797	-3.529*	-47.599	-2.101	-44.839	-0.363*	-47.752	-1.059	-8.048
	ca45	1.018	40.472	-1.392*	-52.769	-1.434*	-48.871	-0.254*	-49.151	-2.521	-26.673
	ca75	12.004	79.377	-1.243	-27.032	-0.952*	-47.407	-0.377	-28.800	-0.807	-20.414
	ca88	11.456*	30.744	-4.517*	-52.938	-2.493*	-46.582	-0.396	-30.909	-2.117	-25.024
	ca98	0.589	6.373	-7.116*	-67.043	-2.098*	-71.489	-0.265	-30.565	-2.858	-46.962
	ca99	3.388	28.336	-2.766	-39.983	-1.286*	-48.316	-0.254	-32.975	-1.504	-33.318
	co00	1.956	18.505	-6.674*	-48.434	-1.810*	-66.850	-0.400*	-43.074	-2.083	-35.954
	co01	10.121*	62.536	-3.479	-20.176	-1.329*	-44.684	-0.656	-42.711	-0.675	-17.075
	co02	4.691	88.297	-0.972	-12.748	-0.601	-32.111	-0.283	-37.214	-0.715	-23.569
	co15	2.140	34.196	-5.059*	-38.244	-1.829*	-53.014	-0.270*	-41.167	-1.193*	-35.769
	co19	3.975*	45.237	-2.310	-24.277	-1.300*	-54.610	-0.160	-17.780	-0.978*	-35.681
	co21	4.395*	62.489	-2.726	-26.850	-1.507*	-52.697	-0.520*	-50.061	-0.568	-23.138
	co22	2.022	10.012	-5.045*	-43.863	-1.795*	-65.640	-0.213	-31.164	-1.331*	-43.660
	co97	4.546*	162.938	0.719	13.715	-0.469	-29.992	0.066	17.290	0.506	33.869
	co98	-0.176	-2.718	-4.188*	-45.553	-1.306*	-58.458	-0.224*	-38.837	-0.577	-24.534
	co99	1.084	19.604	-4.882	-26.272	-1.198*	-35.450	-0.181*	-32.469	-0.231	-8.508
	ia08	10.961*	51.770	0.562	3.310	-0.182	-3.918	-0.158	-15.864	-0.258	-12.483
	ia23	14.272*	91.988	-0.600	-4.208	-0.513	-21.663	-0.106	-15.481	-0.314	-13.410
	id03	8.595*	110.849	-4.522	-39.011	-1.662*	-57.385	-0.318*	-45.363	-1.170	-29.323
	id11	7.950*	112.733	-1.298	-13.703	-1.249*	-46.534	-0.155	-17.302	1.140	23.453
	id15	3.735*	101.459	0.539	13.784	-0.055	-5.476	0.128	31.874	0.365	13.609
	ks07	4.372	34.134	-1.488	-12.421	-0.805*	-37.164	-0.303	-39.414	-0.986	-26.294
	ks31	5.264*	30.332	-0.593	-3.911	-0.739*	-29.990	-0.157	-22.125	-0.622	-20.846
	ks32	12.420*	62.339	-0.294	-2.182	-0.918	-37.936	-0.300	-25.542	-0.430	-17.641
	la12	-0.211	-1.964	-0.941	-18.245	-1.070*	-26.236	-0.239*	-28.499	-3.070	-19.900
	la30	-2.150	-18.954	-2.055*	-41.947	-1.258*	-35.659	-0.268*	-35.708	-2.628	-21.228
	mn16	-3.341	-18.045	-3.458*	-34.738	-1.153*	-42.180	-0.358*	-43.055	-1.188*	-46.631
	mn18	-0.398	-3.237	-3.411*	-43.475	-1.496*	-62.400	-0.342*	-58.788	-0.960*	-47.633
	mn23	8.736*	50.275	-1.483	-16.092	-0.730	-28.868	-0.201	-32.288	-0.271	-16.138
	mn27	-0.829	-2.563	-5.957*	-35.064	-2.434*	-48.721	-0.477*	-43.761	-0.922*	-34.723
	mo03	0.541	3.577	-2.969	-26.316	-0.683*	-29.106	-0.295*	-38.390	-0.602	-17.290
	mo05	0.912	7.419	-2.791*	-38.128	-1.039*	-44.084	-0.227	-24.301	-0.716	-17.229
	mt00	5.280*	94.964	-3.271	-32.278	-1.659*	-54.788	-0.220	-32.171	-1.136	-37.600
	mt05	0.715	19.846	-1.740*	-37.099	-0.743*	-51.972	-0.136	-20.378	-0.507	-23.756
	mt07	1.354	32.445	-1.739	-26.931	-1.218*	-64.684	-0.267*	-46.368	-1.023*	-44.767
	mt13	7.190*	76.482	-7.390	-46.012	-3.477*	-60.288	-0.482*	-51.669	-0.758	-17.550
	nd07	0.103	0.785	-4.454*	-37.191	-1.392*	-39.947	-0.200	-32.814	-0.687	-22.392
	nd08	6.749	33.177	-4.528*	-33.380	-1.214	-28.789	-0.180	-21.257	-0.758	-29.027
	nd11	7.878	34.468	-7.261	-36.445	-4.357*	-54.437	-1.068*	-51.747	-2.284*	-50.050
	ne15	0.610	1.795	-2.399	-15.079	-1.037*	-36.077	-0.233*	-27.478	-0.791	-27.844
	nm07	1.485	22.145	-5.494*	-39.985	-1.412*	-59.548	-0.580*	-64.803	-1.780*	-51.614
	nm08	4.683*	88.198	-1.762	-10.553	-1.276*	-45.323	-0.192	-34.113	-1.564	-39.808
	nm09	1.992	32.916	-4.118*	-38.062	-1.307*	-57.385	-0.256*	-44.626	-0.865*	-28.643
	nm12	10.147*	224.953	-0.199	-2.068	-1.145*	-51.085	0.128	24.588	0.325	14.177
	ok00	4.544	27.750	-6.887	-38.156	-1.875*	-54.064	-0.146	-16.327	-3.262*	-45.700
	ok17	0.497	3.418	-2.082	-15.025	-0.552	-20.181	0.317	41.094	-0.550	-12.740
	or02	0.417	28.398	-1.051*	-36.163	-2.589*	-37.916	-0.197	-24.536	-8.796	-31.331
	or09	2.639*	113.339	-0.863	-25.149	-0.616*	-46.120	-0.855*	-71.537	-1.742*	-46.888
	or10	0.167	9.871	-1.001*	-48.060	-0.893*	-44.136	-0.140*	-35.345	-1.477	-21.612
	or18	2.296*	107.112	-1.364*	-42.941	-0.549*	-54.986	-0.122	-27.152	-0.546	-23.875
	or97	3.260*	112.484	-1.356*	-42.919	-1.216*	-33.400	-0.110	-16.675	-0.526	-4.270
	or98	2.381*	66.291	-0.538*	-22.880	-0.769	-24.052	-0.048	-7.626	-0.782	-6.306
	sd08	2.320	16.011	-2.963	-31.685	-1.124*	-52.757	-0.338*	-48.856	-0.389	-17.798
	sd99	9.025	38.663	-2.069	-15.874	-0.921	-25.278	-0.203	-29.007	-0.119	-5.400
	tx03	8.123	70.118	-4.154	-29.400	-1.107	-18.793	-0.026	-2.052	-1.649	-7.954
	tx04	5.146	61.442	-3.723	-13.984	-1.231*	-47.204	-0.174	-21.954	-0.184	-4.448
	tx10	3.686	43.378	-3.257	-38.243	-1.472*	-32.417	0.097	11.714	-2.828	-18.539
	tx16	6.581*	74.111	4.647	33.808	-0.255	-10.896	0.076	11.633	0.832	14.546
	tx21	-1.024	-10.358	-3.471*	-39.886	-1.068*	-34.480	-0.182	-19.349	-1.800	-20.602
	tx22	6.660*	88.288	5.972	40.371	-0.148	-6.026	0.139	29.157	-0.065	-1.963
	tx38	-1.244	-11.390	-3.752*	-44.423	-1.685*	-44.372	-0.867*	-44.249	-3.553*	-33.073
	tx56	3.767	28.864	-7.207*	-37.756	-1.391*	-46.932	-0.300	-32.801	-2.791*	-39.362
	ut01	11.967	33.625	1.038	6.788	-0.805	-18.320	-0.163	-21.373	-1.301	-12.301
	wa14	0.100	8.027	-0.685*	-36.362	-1.015	-24.032	-0.091	-17.296	-0.295	-1.879
	wa19	1.032*	57.147	-0.713*	-41.248	-1.094*	-52.413	-0.000	-0.065	-0.174	-3.945
	wa21	1.445	58.465	-1.579*	-57.388	-2.108*	-65.664	-0.067	-14.033	-6.561*	-55.343
	wy02	0.927	16.481	-6.862*	-54.802	-2.632*	-72.074	-0.242*	-50.588	-1.657*	-51.023
	wy06	3.034*	58.344	-3.709	-32.863	-1.872*	-59.954	-0.284*	-49.033	-1.229	-32.334
	wy08	4.795*	113.937	0.745	9.152	-0.704	-33.909	-0.199	-28.406	0.471	24.535
	wy99	2.861	31.035	-3.790	-25.688	-1.785*	-55.638	-0.299*	-42.363	-1.723*	-52.391

* Annual trend was significant ($p<0.05$).

Table A.5. Departures of observed 1995 bi-monthly and annual mean ammonium ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	23.36	22.32	1.04	23.47	14.51	8.96	29.55	35.39	-5.84	25.67	30.98	-5.31	16.19	22.05	-5.86	28.34	20.64	7.70	16.92	10.34	6.58
	il18	24.46	27.95	-3.49	12.28	19.01	-6.73	38.18	41.51	-3.33	30.13	34.96	-4.83	22.33	26.40	-4.07	26.47	25.65	0.82	17.37	20.17	-2.80
	il63	14.95	13.97	0.98	9.97	9.46	0.51	14.90	18.63	-3.73	32.60	21.72	10.88	13.50	14.74	-1.24	7.93	10.73	-2.80	10.77	8.55	2.22
	in20	27.51	19.04	8.47	17.19	15.58	1.61	30.25	21.39	8.86	42.81	26.19	16.62	37.34	20.96	16.38	26.44	18.14	8.30	11.00	11.97	-0.97
	in34	29.12	21.52	7.60	20.61	16.92	3.69	25.56	32.94	-7.38	35.66	27.32	8.34	31.75	19.66	12.09	37.13	17.16	19.97	24.03	15.11	8.92
	in41	29.23	20.28	8.95	40.47	14.62	25.85	44.93	23.62	21.31	32.29	34.01	-1.72	25.20	18.80	6.40	13.57	18.59	-5.02	18.91	12.02	6.89
	ky03	12.97	13.29	-0.32	10.05	8.32	1.73	13.61	18.32	-4.71	21.53	21.39	0.14	14.00	14.70	-0.70	12.96	11.08	1.88	5.69	5.95	-0.26
	ky22	11.35	8.10	3.25	5.24	5.11	0.13	9.13	11.43	-2.30	17.02	12.20	4.82	16.57	8.96	7.61	11.95	6.46	5.49	8.20	4.44	3.76
	ky38	12.84	13.23	-0.39	8.45	9.22	-0.77	11.62	20.80	-9.18	26.31	20.97	5.34	6.14	11.92	-5.78	14.58	9.58	5.00	9.95	6.89	3.06
	ma08	12.95	10.63	2.32	8.56	5.18	3.38	15.76	10.13	5.63	14.06	20.17	-6.11	24.92	15.17	9.75	9.93	8.37	1.56	4.45	4.74	-0.29
	ma13	10.77	8.71	2.06	6.72	3.63	3.09	18.71	7.80	10.91	16.38	17.45	-1.07	13.14	11.08	2.06	4.51	7.69	-3.18	5.18	4.60	0.58
	md03	14.65	17.32	-2.67	7.68	11.96	-4.28	26.13	19.49	6.64	24.25	30.76	-6.51	12.80	23.32	-10.52	7.71	9.03	-1.32	9.31	9.38	-0.07
	md13	15.90	13.85	2.05	10.34	7.70	2.64	14.35	15.55	-1.20	26.42	21.84	4.58	25.81	18.80	7.01	5.88	11.09	-5.21	12.61	8.08	4.53
	me00	7.29	7.63	-0.34	2.38	3.90	-1.52	11.04	8.04	3.00	9.49	10.63	-1.14	9.83	11.00	-1.17	8.32	7.10	1.22	2.67	5.14	-2.47
	me09	6.51	6.48	0.03	3.19	2.99	0.20	7.19	5.14	2.05	8.36	9.90	-1.54	13.29	11.33	1.96	4.48	6.50	-2.02	2.55	2.99	-0.44
	mi09	22.14	16.86	5.28	15.36	12.99	2.37	23.73	17.39	6.34	27.71	24.00	3.71	29.86	17.92	11.94	17.48	13.34	4.14	18.67	15.54	3.13
	mi26	31.47	21.27	10.20	19.77	17.08	2.69	33.14	25.53	7.61	39.54	31.92	7.62	47.62	19.91	27.71	24.48	18.78	5.70	24.24	14.40	9.84
	mi53	23.03	23.53	-0.50	18.13	21.73	-3.60	25.19	28.67	-3.48	36.52	28.74	7.78	22.78	24.24	-1.46	18.96	20.20	-1.24	16.59	17.61	-1.02
	mi98	15.22	19.54	-4.32	8.49	11.84	-3.35	14.94	29.20	-14.26	24.12	24.68	-0.56	20.31	16.59	3.72	18.63	16.79	1.84	4.86	18.11	-13.25
	mi99	15.40	15.22	0.18	7.28	6.96	0.32	10.71	21.64	-10.93	18.48	19.65	-1.17	26.98	19.01	7.97	21.96	14.92	7.04	6.99	9.13	-2.14
	nh02	11.34	9.11	2.23	12.19	4.15	8.04	14.54	7.97	6.57	9.12	15.11	-5.99	15.14	13.44	1.70	9.44	9.19	0.25	7.58	4.78	2.80
	nj99	15.03	13.69	1.34	7.73	7.25	0.48	22.07	14.00	8.07	20.49	22.20	-1.71	24.31	19.83	4.48	7.68	11.60	-3.92	7.90	7.28	0.62
	ny08	21.34	18.57	2.77	14.74	9.68	5.06	39.95	19.89	20.06	29.54	29.39	0.15	19.36	24.33	-4.97	15.65	16.60	-0.95	8.81	11.55	-2.74
	ny20	13.57	10.36	3.21	7.92	4.97	2.95	15.23	10.71	4.52	22.40	17.05	5.35	20.07	14.89	5.18	8.76	8.85	-0.09	7.03	5.67	1.36
	ny52	23.13	18.53	4.60	13.00	15.64	-2.64	36.62	18.31	18.31	19.78	26.22	-6.44	28.02	20.90	7.12	19.20	15.78	3.42	22.17	14.32	7.85
	ny65	14.54	13.19	1.35	5.74	5.06	0.68	19.43	17.21	2.22	20.90	21.64	-0.74	19.18	17.48	1.70	14.40	11.85	2.55	7.60	5.93	1.67
	ny68	13.34	12.08	1.26	7.16	8.40	-1.24	19.96	12.56	7.40	15.77	18.60	-2.83	20.05	17.89	2.16	8.25	10.76	-2.51	8.86	4.27	4.59
	ny98	12.21	9.84	2.37	8.24	5.92	2.32	14.94	10.72	4.22	18.26	13.63	4.63	17.50	12.58	4.92	6.77	9.95	-3.18	7.56	6.26	1.30
	ny99	14.72	10.68	4.04	5.82	5.70	0.12	18.39	12.41	5.98	34.26	17.29	16.97	22.09	14.19	7.90	4.98	9.18	-4.20	2.79	5.34	-2.55
	oh17	19.33	21.56	-2.23	11.41	14.59	-3.18	27.55	29.04	-1.49	23.26	34.51	-11.25	19.70	23.90	-4.20	17.55	16.87	0.68	16.52	10.45	6.07
	oh49	15.26	14.54	0.72	12.71	9.07	3.64	22.76	15.96	6.80	19.24	21.72	-2.48	14.01	18.56	-4.55	11.28	14.26	-2.98	11.56	7.70	3.86
	oh71	21.30	21.08	0.22	12.09	15.20	-3.11	28.38	25.07	3.31	34.13	32.56	1.57	22.13	24.07	-1.94	15.71	18.05	-2.34	15.35	11.54	3.81
	pa15	15.84	12.77	3.07	7.37	6.58	0.79	31.56	14.82	16.74	22.20	20.12	2.08	19.72	17.24	2.48	5.31	12.04	-6.73	8.89	5.83	3.06
	pa29	16.86	13.65	3.21	15.64	8.56	7.08	28.40	15.00	13.40	13.02	21.33	-8.31	21.82	17.31	4.51	12.36	11.89	0.47	9.94	7.80	2.14
	pa42	14.47	13.89	0.58	8.67	8.45	0.22	29.52	15.61	13.91	20.21	23.07	-2.86	14.64	17.42	-2.78	6.27	12.20	-5.93	7.50	6.60	0.90
	pa72	14.18	10.76	3.42	5.47	6.07	-0.60	19.46	11.68	7.78	25.96	17.05	8.91	23.99	15.97	8.02	5.63	8.95	-3.32	4.59	4.85	-0.26
	va00	13.00	11.44	1.56	7.37	8.90	-1.53	15.27	14.55	0.72	28.12	19.20	8.92	13.51	14.24	-0.73	5.98	6.37	-0.39	7.77	5.38	2.39
	va13	10.50	11.01	-0.51	5.63	5.09	0.54	14.38	12.37	2.01	15.88	19.22	-3.34	12.79	15.58	-2.79	10.51	9.75	0.76	3.81	4.01	-0.20
	va28	8.34	10.36	-2.02	5.10	6.06	-0.96	13.55	11.40	2.15	10.84	16.64	-5.80	9.47	14.36	-4.89	3.75	9.94	-6.19	7.31	3.75	3.56
	vt01	14.95	12.24	2.71	13.64	7.44	6.20	17.23	12.46	4.77	21.15	20.65	0.50	25.95	16.62	9.33	5.85	10.95	-5.10	5.91	5.35	0.56
	vt99	12.57	12.65	-0.08	8.70	7.41	1.29	15.76	13.90	1.86	21.38	18.67	2.71	15.15	15.36	-0.21	5.84	12.38	-6.54	8.57	8.16	0.41
	wi28	26.59	22.04	4.55	32.51	14.39	18.12	21.28	32.55	-11.27	35.25	28.40	6.85	32.25	20.93	11.32	20.63	20.43	0.20	17.60	15.57	2.03
	wi36	13.75	16.25	-2.50	12.17	7.11	5.06	12.91	25.46	-12.55	19.80	20.46	-0.66	17.55	19.68	-2.13	12.33	16.25	-3.92	7.74	8.55	-0.81
	wi37	17.96	21.34	-3.38	11.64	12.62	-0.98	17.97	25.76	-7.79	19.16	29.96	-10.80	34.98	20.59	14.39	15.08	25.17	-10.09	8.90	13.93	-5.03
	wi99	23.44	23.24	0.20	10.11	15.59	-5.48	23.23	31.95	-8.72	29.52	29.61	-0.09	27.30	23.99	3.31	29.86	19.66	10.20	20.64	18.63	2.01
	wv04	12.09	8.66	3.43	5.98	6.06	-0.08	15.87	12.67	3.20	18.99	11.61	7.38	9.94	9.06	0.88	9.87	7.46	2.41	11.89	5.07	6.82
	wv18	16.57	12.81	3.76	13.81	8.52	5.29	27.41	13.80	13.61	22.64	20.09	2.55	14.94	15.55	-0.61	7.04	12.83	-5.79	13.60	6.08	7.52

Table A.5 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	7.91	5.72	2.19	7.02	4.04	2.98	9.73	9.25	0.48	12.49	7.85	4.64	6.32	5.64	0.68	7.55	3.93	3.62	4.37	3.58	0.79
	fl03	6.81	5.59	1.22	5.41	5.68	-0.27	9.33	7.99	1.34	9.73	7.47	2.26	7.62	5.11	2.51	3.20	4.12	-0.92	5.55	3.19	2.36
	fl11	6.84	6.47	0.37	7.19	6.84	0.35	11.62	12.38	-0.76	6.98	6.59	0.39	4.75	3.57	1.18	3.70	3.59	0.11	6.77	5.87	0.90
	fl41	5.86	6.74	-0.88	5.92	4.44	1.48	10.16	11.59	-1.43	5.63	8.50	-2.87	6.12	5.37	0.75	4.04	5.34	-1.30	3.30	5.19	-1.89
	ga41	15.63	8.43	7.20	9.83	6.33	3.50	15.25	10.15	5.10	45.41	14.92	30.49	9.79	5.92	3.87	5.88	7.14	-1.26	7.59	6.08	1.51
	ms10	13.74	10.33	3.41	11.15	8.22	2.93	17.78	16.95	0.83	24.70	12.72	11.98	9.69	9.57	0.12	11.77	8.03	3.74	7.34	6.48	0.86
	ms30	10.07	8.08	1.99	9.22	6.83	2.39	12.02	12.74	-0.72	16.49	11.40	5.09	7.01	5.47	1.54	10.19	7.24	2.95	5.47	4.82	0.65
	nc03	10.04	9.86	0.18	4.79	6.43	-1.64	10.63	9.54	1.09	15.15	16.84	-1.69	13.84	13.08	0.76	8.68	8.31	0.37	7.15	4.95	2.20
	nc25	9.13	6.99	2.14	5.33	4.74	0.59	13.47	9.68	3.79	13.73	12.12	1.61	12.69	5.64	7.05	6.47	6.64	-0.17	3.09	3.10	-0.01
	nc34	17.00	12.94	4.06	10.25	8.90	1.35	29.30	12.50	16.80	23.21	20.49	2.72	13.35	20.59	-7.24	12.69	7.93	4.76	13.23	7.20	6.03
	nc36	10.27	10.40	-0.13	7.13	8.72	-1.59	13.96	13.57	0.39	12.76	16.33	-3.57	13.60	11.37	2.23	5.68	6.69	-1.01	8.51	5.69	2.82
	nc41	14.99	17.01	-2.02	9.10	12.77	-3.67	18.24	17.02	1.22	23.09	27.50	-4.41	14.84	18.56	-3.72	10.44	13.79	-3.35	14.24	12.43	1.81
	sc06	7.44	8.09	-0.65	7.67	6.67	1.00	9.63	8.41	1.22	8.81	15.77	-6.96	9.24	7.56	1.68	2.91	4.04	-1.13	6.38	6.10	0.28
	tn00	14.09	10.54	3.55	8.64	6.68	1.96	20.37	12.80	7.57	19.30	18.62	0.68	17.23	10.74	6.49	12.47	8.20	4.27	6.52	6.20	0.32
	tn11	9.75	8.00	1.75	7.61	3.56	4.05	7.85	8.59	-0.74	17.53	12.42	5.11	9.64	9.23	0.41	7.71	11.29	-3.58	8.17	2.92	5.25
West	ar02	15.17	11.80	3.37	9.64	8.33	1.31	20.37	16.76	3.61	24.59	16.94	7.65	8.40	13.29	-4.89	24.47	8.11	16.36	3.57	7.36	-3.79
	ar03	14.85	11.25	3.60	8.96	8.04	0.92	15.48	16.74	-1.26	19.88	19.09	0.79	14.16	10.31	3.85	19.15	6.42	12.73	11.49	6.86	4.63
	ar27	18.55	14.25	4.30	10.58	12.53	-1.95	16.96	14.60	2.36	27.66	18.72	8.94	16.04	18.20	-2.16	25.82	11.52	14.30	14.26	9.94	4.32
	az03	9.55	8.61	0.94	1.90	3.28	-1.38	6.23	5.89	0.34	13.77	19.30	-5.53	16.65	10.45	6.20	10.82	8.55	2.27	7.92	4.19	3.73
	co00	13.70	12.77	0.93	5.90	5.76	0.14	7.73	9.15	-1.42	13.87	27.02	-13.15	18.32	19.95	-1.63	24.73	11.86	12.87	11.64	2.87	8.77
	co02	12.19	10.73	1.46	3.49	3.86	-0.37	11.71	11.10	0.61	36.81	19.98	16.83	11.88	14.10	-2.22	7.13	10.35	-3.22	2.12	4.99	-2.87
	co15	7.84	8.68	-0.84	1.77	2.80	-1.03	6.30	7.56	-1.26	9.70	15.43	-5.73	15.29	16.93	-1.64	8.72	5.81	2.91	5.29	3.53	1.76
	co19	12.74	13.30	-0.56	4.91	4.19	0.72	12.22	14.13	-1.91	10.00	19.33	-9.33	20.91	24.12	-3.21	18.14	13.47	4.67	10.28	4.59	5.69
	co22	30.04	22.45	7.59	17.45	8.46	8.99	36.81	26.26	10.55	23.50	33.16	-9.66	65.18	35.86	29.32	18.33	22.85	-4.52	18.94	8.12	10.82
	co97	6.86	8.17	-1.31	5.90	5.31	0.59	8.40	11.37	-2.97	5.82	9.07	-3.25	7.16	12.31	-5.15	9.27	6.63	2.64	4.61	4.33	0.28
	co98	6.51	6.28	0.23	3.09	2.12	0.97	5.22	7.12	-1.90	6.69	9.98	-3.29	9.34	10.60	-1.26	10.23	5.60	4.63	4.50	2.24	2.26
	co99	12.06	6.75	5.31	3.23	3.40	-0.17	3.77	5.09	-1.32	28.53	10.37	18.16	12.62	9.72	2.90	5.81	8.01	-2.20	18.38	3.88	14.50
	ia08	28.18	33.66	-5.48	6.85	31.00	-24.15	42.81	51.10	-8.29	27.37	39.55	-12.18	31.59	24.07	7.52	34.79	26.10	8.69	25.67	30.13	-4.46
	ia23	31.67	32.03	-0.36	22.42	28.45	-6.03	42.04	53.10	-11.06	23.20	37.14	-13.94	27.41	25.55	1.86	26.35	22.87	3.48	48.58	25.06	23.52
	id03	17.43	17.76	-0.33	11.46	7.22	4.24	12.60	23.27	-10.67	9.70	23.68	-13.98	38.34	34.24	4.10	28.75	11.49	17.26	3.70	6.68	-2.98
	id11	9.91	16.31	-6.40	7.98	8.38	-0.40	5.08	13.04	-7.96	18.49	24.28	-5.79	20.92	40.76	-19.84	5.26	7.01	-1.75	1.74	4.41	-2.67
	ks31	26.71	23.29	3.42	40.46	23.20	17.26	21.03	32.02	-10.99	24.56	25.71	-1.15	12.87	20.16	-7.29	18.26	20.97	-2.71	43.05	17.72	25.33
	ks32	34.15	34.13	0.02	21.25	28.06	-6.81	45.28	35.93	9.35	36.87	43.63	-6.76	53.10	37.70	15.40	32.32	33.77	-1.45	16.08	25.70	-9.62
	la12	14.92	10.50	4.42	13.53	9.66	3.87	23.08	17.39	5.69	28.34	12.32	16.02	12.62	8.54	4.08	7.25	5.26	1.99	4.72	9.83	-5.11
	la30	13.42	8.98	4.44	8.17	6.17	2.00	13.68	14.09	-0.41	22.16	11.48	10.68	18.34	9.85	8.49	10.41	7.92	2.49	7.73	4.37	3.36
	mn16	13.24	14.84	-1.60	9.37	7.16	2.21	13.80	19.24	-5.44	16.60	17.66	-1.06	19.41	14.34	5.07	14.03	13.43	0.60	6.25	17.22	-10.97
	mn23	19.10	27.32	-8.22	14.34	16.01	-1.67	27.36	33.37	-6.01	19.36	31.47	-12.11	32.51	29.77	2.74	8.86	22.69	-13.83	12.18	30.62	-18.44
	mo03	19.20	15.71	3.49	10.67	16.27	-5.60	21.30	20.98	0.32	22.42	19.00	3.42	14.92	15.47	-0.55	27.53	13.43	14.10	18.38	9.13	9.25
	mt00	10.88	11.67	-0.79	7.24	7.05	0.19	12.34	14.98	-2.64	8.42	14.82	-6.40	19.39	18.15	1.24	13.29	8.39	4.90	4.58	6.66	-2.08
	mt05	4.52	4.40	0.12	3.66	2.84	0.82	7.09	5.96	1.13	3.64	4.57	-0.93	6.20	5.69	0.51	4.24	4.55	-0.31	2.30	2.80	-0.50
	nd08	30.14	27.97	2.17	12.67	22.22	-9.55	39.16	45.38	-6.22	60.66	30.25	30.41	21.16	23.13	-1.97	31.08	24.50	6.58	16.12	22.33	-6.21
	nm07	8.85	8.38	0.47	4.80	6.17	-1.37	8.47	7.06	1.41	8.36	15.78	-7.42	13.40	9.78	3.62	8.30	7.12	1.18	9.78	4.35	5.43
	nm08	13.76	10.72	3.04	3.90	5.63	-1.73	15.41	10.09	5.32	23.75	18.10	5.65	13.12	12.02	1.10	10.51	12.58	-2.07	15.84	5.89	9.95
	nm09	12.87	8.30	4.57	3.98	3.45	0.53	8.20	5.05	3.15	21.59	16.18	5.41	18.79	12.58	6.21	11.74	8.67	3.07	12.94	3.88	9.06
	ok00	23.23	21.50	1.73	18.96	28.03	-9.07	21.75	29.19	-7.44	32.59	18.96	13.63	9.39	22.14	-12.75	21.98	17.99	3.99	34.69	12.66	22.03
	ok17	16.51	15.09	1.42	15.84	13.36	2.48	22.01	20.74	1.27	22.46	19.29	3.17	14.07	15.78	-1.71	14.48	9.70	4.78	10.17	11.67	-1.50
	or09	5.63	5.40	0.23	1.79	3.44	-1.65	2.38	6.69	-4.31	4.27	7.01	-2.74	21.81	6.30	15.51	1.98	6.16	-4.18	1.58	2.83	-1.25
	or10	2.05	1.88	0.17	1.16	1.25	-0.09	2.07	1.95	0.12	2.92	2.32	0.60	3.67	2.52	1.15	1.27	1.79	-0.52	1.23	1.42	-0.19
	or18	3.07	4.81	-1.74	1.76	2.21	-0.45	2.07	4.12	-2.05	5.12	5.82	-0.70	3.31	10.53	-7.22	4.56	4.15	0.41	1.61	2.05	-0.44
	or97	5.46	6.70	-1.24	1.82	4.18	-2.36	7.03	10.60	-3.57	6.05	5.67	0.38	10.22	7.68	2.54	4.92	8.35	-3.43	2.74	3.70	-0.96
	sd08	15.20	17.09	-1.89	9.54	10.65	-1.11	23.83	30.09	-6.26	16.27	20.37	-4.10	23.84	20.52	3.32	8.89	13.54	-4.65	8.82	7.39	1.43
	sd99	27.49	33.57	-6.08	25.11	27.37	-2.26	30.99	54.57	-23.58	25.05	38.80	-13.75	32.48	35.16	-2.68	38.15	26.73	11.42	13.18	18.76	-5.58

Table A.5 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	21.67	20.91	0.76	27.47	21.89	5.58	20.61	34.60	-13.99	43.46	25.38	18.08	13.91	10.08	3.83	13.00	12.73	0.27	11.60	20.76	-9.16
	tx10	10.10	12.68	-2.58	11.89	12.47	-0.58	10.14	18.13	-7.99	16.28	20.22	-3.94	9.87	10.53	-0.66	4.83	7.62	-2.79	7.56	7.12	0.44
	tx16	20.22	16.44	3.78	17.57	13.72	3.85	18.65	22.14	-3.49	27.80	24.02	3.78	16.87	11.43	5.44	19.89	11.23	8.66	20.51	16.10	4.41
	tx21	13.65	8.76	4.89	7.93	8.41	-0.48	19.96	11.16	8.80	16.48	14.06	2.42	14.58	7.48	7.10	10.47	5.83	4.64	12.47	5.61	6.86
	tx56	16.97	17.30	-0.33	12.06	17.17	-5.11	21.65	32.35	-10.70	26.00	20.81	5.19	10.08	13.22	-3.14	23.93	8.60	15.33	8.08	11.63	-3.55
	wa14	1.72	1.35	0.37	1.39	1.40	-0.01	1.33	1.39	-0.06	2.32	1.41	0.91	2.07	1.36	0.71	2.13	1.25	0.88	1.11	1.30	-0.19
	wa21	4.75	4.12	0.63	2.59	2.13	0.46	5.14	5.11	0.03	10.21	5.47	4.74	5.62	5.16	0.46	2.97	4.64	-1.67	1.96	2.24	-0.28
	wy02	7.02	6.66	0.36	3.27	2.97	0.30	11.66	9.01	2.65	5.57	6.57	-1.00	11.03	14.01	-2.98	8.29	5.12	3.17	2.31	2.27	0.04
	wy08	7.96	9.80	-1.84	3.79	4.69	-0.90	6.22	9.79	-3.57	10.94	14.87	-3.93	12.49	16.98	-4.49	9.59	7.76	1.83	4.71	4.69	0.02
	wy99	15.17	12.45	2.72	17.40	7.74	9.66	18.14	19.66	-1.52	15.21	16.69	-1.48	15.73	17.40	-1.67	14.09	8.86	5.23	10.45	4.34	6.11

Table A.6. Departures of observed 1995 bi-monthly and annual mean calcium ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	10.19	7.53	2.66	6.58	3.34	3.24	12.67	11.31	1.36	14.08	10.76	3.32	6.93	9.62	-2.69	17.22	7.03	10.19	3.65	3.12	0.53
	il18	10.02	9.36	0.66	2.38	4.62	-2.24	15.01	12.72	2.29	10.75	13.33	-2.58	10.25	12.17	-1.92	13.49	7.87	5.62	8.26	5.46	2.80
	il63	6.71	6.11	0.60	5.69	3.62	2.07	6.84	9.15	-2.31	10.92	8.06	2.86	7.82	7.77	0.05	5.78	5.31	0.47	3.20	2.72	0.48
	in20	12.52	7.05	5.47	5.44	4.47	0.97	13.49	8.34	5.15	17.09	9.17	7.92	17.53	8.62	8.91	11.82	8.32	3.50	9.75	3.39	6.36
	in34	24.65	20.05	4.60	19.97	21.84	-1.87	18.75	25.78	-7.03	25.99	19.71	6.28	33.23	24.49	8.74	33.30	15.90	17.40	16.65	12.61	4.04
	in41	16.78	8.09	8.69	20.34	5.06	15.28	32.76	9.27	23.49	12.67	14.47	-1.80	14.86	8.69	6.17	8.34	7.62	0.72	11.72	3.41	8.31
	ky03	5.62	3.88	1.74	4.06	2.23	1.83	6.38	6.28	0.10	7.18	4.79	2.39	5.39	4.79	0.60	6.25	3.27	2.98	4.44	1.90	2.54
	ky22	6.99	3.69	3.30	3.71	3.54	0.17	6.87	5.35	1.52	6.49	4.65	1.84	14.21	3.94	10.27	5.28	2.53	2.75	5.36	2.16	3.20
	ky38	6.00	4.57	1.43	3.06	2.89	0.17	5.56	7.61	-2.05	11.44	5.48	5.96	6.21	5.99	0.22	5.40	3.49	1.91	4.33	1.97	2.36
	ma08	3.29	2.00	1.29	2.38	1.77	0.61	5.13	2.29	2.84	3.14	3.35	-0.21	4.46	1.82	2.64	1.74	1.49	0.25	2.89	1.30	1.59
	ma13	3.71	3.28	0.43	2.67	3.16	-0.49	5.74	3.81	1.93	5.17	4.41	0.76	3.41	3.27	0.14	1.97	2.81	-0.84	3.30	2.19	1.11
	md03	4.47	3.88	0.59	3.62	3.04	0.58	9.10	5.50	3.60	6.91	6.13	0.78	3.36	4.61	-1.25	1.56	2.11	-0.55	2.25	1.87	0.38
	md13	3.57	3.04	0.53	2.00	2.01	-0.01	5.13	4.54	0.59	5.64	3.79	1.85	4.16	3.75	0.41	1.25	2.28	-1.03	3.26	1.90	1.36
	me00	3.94	3.44	0.50	4.18	2.96	1.22	7.57	5.59	1.98	4.33	4.18	0.15	3.49	2.54	0.95	2.33	2.63	-0.30	1.72	2.73	-1.01
	me09	1.97	1.64	0.33	0.85	1.29	-0.44	3.24	1.64	1.60	2.01	2.65	-0.64	2.45	1.85	0.60	1.92	1.50	0.42	1.35	0.88	0.47
	mi09	11.15	7.16	3.99	4.97	5.69	-0.72	13.24	6.78	6.46	18.74	10.61	8.13	8.16	7.79	0.37	13.07	6.32	6.75	8.72	5.79	2.93
	mi26	12.89	7.33	5.56	4.18	6.46	-2.28	19.94	9.26	10.68	11.80	9.58	2.22	17.81	8.27	9.54	7.90	6.65	1.25	15.70	3.75	11.95
	mi53	10.52	9.40	1.12	9.49	9.40	0.09	14.13	10.87	3.26	14.88	11.52	3.36	7.84	9.85	-2.01	9.76	7.95	1.81	7.02	6.80	0.22
	mi98	6.66	6.07	0.59	2.88	4.52	-1.64	8.42	10.34	-1.92	10.47	7.74	2.73	8.24	5.39	2.85	7.73	4.83	2.90	2.21	3.59	-1.38
	mi99	8.15	5.64	2.51	2.36	3.61	-1.25	3.70	7.63	-3.93	7.37	7.21	0.16	17.69	6.90	10.79	11.78	5.44	6.34	6.00	3.05	2.95
	nh02	2.43	1.99	0.44	1.70	1.32	0.38	3.40	2.30	1.10	3.03	3.17	-0.14	2.41	1.99	0.42	1.94	1.90	0.04	2.12	1.26	0.86
	nj99	3.93	3.13	0.80	1.58	2.34	-0.76	7.36	3.44	3.92	5.96	4.27	1.69	4.25	3.50	0.75	2.00	3.48	-1.48	2.44	1.78	0.66
	ny08	6.25	4.66	1.59	2.07	3.39	-1.32	10.63	5.14	5.49	9.78	6.97	2.81	7.53	5.82	1.71	4.75	4.39	0.36	2.71	2.27	0.44
	ny20	3.82	2.70	1.12	2.09	1.98	0.11	4.29	3.18	1.11	7.76	4.26	3.50	4.21	3.22	0.99	1.86	2.12	-0.26	2.72	1.43	1.29
	ny52	8.71	5.43	3.28	12.33	5.73	6.60	12.63	6.61	6.02	6.19	6.24	-0.05	9.68	5.11	4.57	5.20	4.65	0.55	6.23	4.23	2.00
	ny65	4.24	3.24	1.00	1.17	1.84	-0.67	7.26	4.64	2.62	6.35	5.41	0.94	5.00	3.41	1.59	3.72	2.50	1.22	1.93	1.63	0.30
	ny68	2.81	2.70	0.11	1.56	2.39	-0.83	4.39	3.37	1.02	4.02	3.77	0.25	3.42	2.80	0.62	1.37	2.27	-0.90	2.11	1.58	0.53
	ny98	3.29	2.73	0.56	1.39	1.61	-0.22	4.42	3.78	0.64	5.27	3.70	1.57	3.27	2.89	0.38	2.56	2.58	-0.02	2.82	1.82	1.00
	ny99	4.63	3.01	1.62	1.62	2.24	-0.62	5.87	4.45	1.42	11.44	3.74	7.70	4.38	3.62	0.76	2.39	2.41	-0.02	2.05	1.57	0.48
	oh17	8.25	6.51	1.74	3.29	4.54	-1.25	13.82	8.60	5.22	7.00	9.16	-2.16	7.96	8.08	-0.12	4.15	5.52	-1.37	13.27	3.13	10.14
	oh49	8.57	6.73	1.84	8.68	4.02	4.66	11.25	7.86	3.39	6.29	8.76	-2.47	8.00	8.55	-0.55	11.21	8.25	2.96	6.00	2.93	3.07
	oh71	8.40	7.29	1.11	3.25	5.06	-1.81	16.42	9.65	6.77	11.50	10.85	0.65	7.89	8.60	-0.71	4.63	6.26	-1.63	6.68	3.34	3.34
	pa15	5.74	3.71	2.03	2.65	2.66	-0.01	11.39	4.86	6.53	6.82	5.06	1.76	8.36	4.60	3.76	2.34	3.52	-1.18	2.88	1.58	1.30
	pa29	5.46	4.60	0.86	5.08	3.42	1.66	8.64	5.91	2.73	4.58	6.04	-1.46	5.68	5.43	0.25	5.29	4.18	1.11	3.47	2.60	0.87
	pa42	5.33	4.26	1.07	2.62	2.93	-0.31	9.13	5.41	3.72	5.16	5.15	0.01	8.01	5.29	2.72	2.85	4.52	-1.67	4.18	2.26	1.92
	pa72	3.70	2.81	0.89	1.23	2.10	-0.87	5.31	4.02	1.29	7.86	3.56	4.30	5.43	3.08	2.35	1.02	2.60	-1.58	1.32	1.47	-0.15
	va00	3.60	2.62	0.98	2.21	1.82	0.39	5.27	3.69	1.58	5.65	4.13	1.52	4.72	2.85	1.87	1.61	1.91	-0.30	2.13	1.34	0.79
	va13	5.34	4.52	0.82	2.04	2.85	-0.81	9.25	5.62	3.63	7.57	6.17	1.40	5.46	5.60	-0.14	5.69	5.17	0.52	2.05	1.71	0.34
	va28	2.05	1.85	0.20	1.99	1.39	0.60	3.90	2.36	1.54	2.45	2.49	-0.04	1.73	2.36	-0.63	1.00	1.65	-0.65	1.24	0.86	0.38
	vt01	4.42	4.61	-0.19	3.74	4.74	-1.00	4.28	5.36	-1.08	5.89	5.69	0.20	4.55	3.97	0.58	1.48	4.42	-2.94	6.56	3.48	3.08
	vt99	2.95	3.22	-0.27	2.19	2.13	0.06	3.24	4.17	-0.93	4.44	5.22	-0.78	2.36	2.70	-0.34	3.66	3.11	0.55	1.78	2.02	-0.24
	wi28	10.70	7.47	3.23	16.04	4.27	11.77	5.86	10.62	-4.76	9.15	10.13	-0.98	14.59	9.26	5.33	12.20	7.49	4.71	6.34	3.06	3.28
	wi36	7.49	6.14	1.35	8.75	4.41	4.34	6.54	9.71	-3.17	12.36	7.86	4.50	6.46	5.85	0.61	7.98	5.99	1.99	2.85	3.02	-0.17
	wi37	10.36	8.72	1.64	12.77	4.99	7.78	10.54	10.06	0.48	8.90	12.65	-3.75	9.08	9.83	-0.75	18.79	9.30	9.49	2.09	5.50	-3.41
	wi99	11.10	9.24	1.86	2.34	5.77	-3.43	9.20	11.31	-2.11	13.97	12.08	1.89	14.57	11.97	2.60	18.04	9.01	9.03	8.47	5.28	3.19
	wv04	4.44	2.91	1.53	2.16	2.54	-0.38	7.16	4.75	2.41	6.12	3.33	2.79	3.69	2.73	0.96	3.85	2.47	1.38	3.64	1.64	2.00
	wv18	6.77	6.44	0.33	7.30	6.13	1.17	11.73	8.31	3.42	7.09	7.88	-0.79	5.93	7.22	-1.29	3.37	5.10	-1.73	5.22	4.02	1.20

Table A.6 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	2.78	2.71	0.07	2.88	2.29	0.59	3.98	4.06	-0.08	3.44	3.39	0.05	2.66	3.54	-0.88	1.72	1.61	0.11	2.02	1.39	0.63
	fl03	3.78	3.73	0.05	4.48	2.89	1.59	4.63	4.62	0.01	4.32	4.85	-0.53	2.90	4.48	-1.58	3.92	2.31	1.61	2.42	3.25	-0.83
	fl11	6.60	5.54	1.06	6.46	5.76	0.70	8.41	6.63	1.78	3.46	4.18	-0.72	7.91	6.83	1.08	5.28	5.07	0.21	8.10	4.75	3.35
	fl41	3.93	4.77	-0.84	3.28	3.60	-0.32	4.27	5.38	-1.11	3.95	5.72	-1.77	4.31	6.14	-1.83	3.31	3.45	-0.14	4.45	4.32	0.13
	ga41	3.74	2.01	1.73	4.06	1.76	2.30	4.48	3.07	1.41	5.86	3.20	2.66	4.01	1.52	2.49	1.26	1.22	0.04	2.75	1.29	1.46
	ms10	4.23	3.21	1.02	5.02	2.69	2.33	4.27	5.81	-1.54	6.62	3.91	2.71	4.40	3.10	1.30	2.44	2.12	0.32	2.64	1.62	1.02
	ms30	4.79	3.28	1.51	3.88	2.94	0.94	3.85	5.70	-1.85	5.02	3.28	1.74	3.68	3.73	-0.05	9.27	2.08	7.19	3.05	1.97	1.08
	nc03	2.73	2.13	0.60	2.27	1.56	0.71	4.34	3.30	1.04	3.61	2.71	0.90	2.50	1.89	0.61	1.42	1.55	-0.13	2.24	1.76	0.48
	nc25	2.50	1.85	0.65	2.00	1.27	0.73	5.49	4.27	1.22	3.52	2.06	1.46	1.95	1.69	0.26	1.04	0.96	0.08	1.00	0.82	0.18
	nc34	3.37	2.54	0.83	2.24	1.52	0.72	7.07	3.50	3.57	3.99	4.50	-0.51	2.57	2.68	-0.11	1.92	1.56	0.36	2.42	1.49	0.93
	nc36	3.26	2.70	0.56	2.63	2.49	0.14	7.04	4.63	2.41	2.65	3.32	-0.67	2.04	2.31	-0.27	1.92	1.59	0.33	3.29	1.90	1.39
	nc41	2.71	2.10	0.61	2.02	1.53	0.49	4.47	3.13	1.34	4.32	2.36	1.96	2.17	2.61	-0.44	1.29	1.54	-0.25	1.99	1.46	0.53
	sc06	3.39	3.85	-0.46	3.73	2.90	0.83	3.98	5.22	-1.24	3.20	6.63	-3.43	2.49	3.91	-1.42	3.81	1.97	1.84	3.10	2.46	0.64
	tn00	6.11	3.18	2.93	3.36	2.14	1.22	7.59	4.99	2.60	10.48	4.36	6.12	8.65	3.69	4.96	2.71	2.33	0.38	3.87	1.57	2.30
	tn11	3.42	2.78	0.64	2.96	1.78	1.18	5.25	4.18	1.07	5.31	4.12	1.19	2.90	2.74	0.16	0.95	2.64	-1.69	3.13	1.18	1.95
West	ar02	6.61	3.82	2.79	5.62	2.80	2.82	6.11	5.99	0.12	6.28	4.29	1.99	6.65	5.31	1.34	11.29	2.45	8.84	3.69	2.08	1.61
	ar03	8.10	5.05	3.05	7.39	3.05	4.34	13.96	7.67	6.29	6.38	7.01	-0.63	8.32	6.83	1.49	6.77	3.04	3.73	5.79	2.69	3.10
	ar27	8.80	6.24	2.56	3.33	4.07	-0.74	10.60	9.33	1.27	8.97	7.22	1.75	11.95	9.14	2.81	8.72	4.41	4.31	9.22	3.25	5.97
	az03	11.85	10.55	1.30	1.99	4.21	-2.22	3.83	8.95	-5.12	25.85	22.35	3.50	20.65	14.51	6.14	9.90	7.35	2.55	8.89	5.96	2.93
	co00	14.44	6.60	7.84	3.38	3.11	0.27	40.37	9.32	31.05	25.83	11.21	14.62	7.10	6.60	0.50	6.50	4.66	1.84	3.49	4.72	-1.23
	co02	14.80	6.56	8.24	2.12	3.74	-1.62	7.79	8.79	-1.00	27.52	7.12	20.40	10.98	7.93	3.05	34.40	6.03	28.37	5.98	5.73	0.25
	co15	9.19	7.74	1.45	4.59	4.23	0.36	8.43	9.77	-1.34	8.87	12.11	-3.24	14.55	10.44	4.11	11.11	5.93	5.18	7.56	3.99	3.57
	co19	6.97	6.99	-0.02	2.07	3.32	-1.25	5.55	6.21	-0.66	6.74	11.16	-4.42	10.60	10.99	-0.39	12.89	7.21	5.68	3.98	3.03	0.95
	co22	8.70	6.06	2.64	2.66	3.15	-0.49	11.33	8.21	3.12	7.15	9.69	-2.54	17.43	7.12	10.31	7.80	6.08	1.72	5.81	2.09	3.72
	co97	6.17	6.04	0.13	1.89	3.96	-2.07	7.81	8.77	-0.96	6.18	9.93	-3.75	6.85	6.44	0.41	9.85	4.11	5.74	4.44	3.04	1.40
	co98	5.33	4.68	0.65	2.58	1.94	0.64	4.48	5.79	-1.31	7.01	9.04	-2.03	5.81	5.62	0.19	8.80	3.92	4.88	3.32	1.76	1.56
	co99	17.84	13.24	4.60	8.42	7.58	0.84	5.28	23.22	-17.94	33.40	19.42	13.98	17.65	10.52	7.13	3.73	11.09	-7.36	38.57	7.63	30.94
	ia08	25.01	17.60	7.41	22.87	9.97	12.90	19.61	18.93	0.68	33.25	23.91	9.34	32.10	18.85	13.25	27.94	15.62	12.32	14.29	18.29	-4.00
	ia23	18.57	13.60	4.97	6.10	5.98	0.12	36.15	19.31	16.84	12.96	20.87	-7.91	19.35	16.61	2.74	16.64	9.68	6.96	20.24	9.13	11.11
	id03	14.29	6.69	7.60	2.39	1.91	0.48	12.26	7.44	4.82	10.12	11.46	-1.34	22.24	10.96	11.28	18.69	6.46	12.23	20.05	1.92	18.13
	id11	9.51	8.04	1.47	1.03	2.54	-1.51	15.31	6.93	8.38	6.40	9.83	-3.43	18.68	17.98	0.70	13.88	6.74	7.14	1.75	4.23	-2.48
	ks31	14.30	14.51	-0.21	9.54	9.83	-0.29	16.53	16.68	-0.15	14.42	15.89	-1.47	10.07	17.14	-7.07	14.06	16.98	-2.92	21.17	10.54	10.63
	ks32	16.24	13.13	3.11	6.17	5.99	0.18	29.82	14.00	15.82	18.04	17.64	0.40	11.76	18.15	-6.39	25.68	13.66	12.02	5.99	9.37	-3.38
	la12	5.58	4.12	1.46	6.66	3.46	3.20	6.82	7.08	-0.26	7.22	4.24	2.98	6.99	4.61	2.38	3.49	3.03	0.46	2.31	2.31	0.00
	la30	4.54	2.68	1.86	3.42	2.29	1.13	6.60	5.13	1.47	5.76	2.73	3.03	5.88	2.74	3.14	3.12	1.57	1.55	2.47	1.60	0.87
	mn16	5.45	6.20	-0.75	3.13	4.93	-1.80	6.66	7.32	-0.66	6.00	7.47	-1.47	6.17	6.48	-0.31	4.83	5.37	-0.54	5.90	5.60	0.30
	mn23	8.19	7.58	0.61	5.32	4.95	0.37	11.31	6.81	4.50	7.23	10.14	-2.91	12.46	9.55	2.91	5.35	6.18	-0.83	7.49	7.87	-0.38
	mo03	10.56	8.03	2.53	5.41	4.86	0.55	10.33	10.12	0.21	8.21	10.55	-2.34	9.79	11.52	-1.73	19.42	7.49	11.93	10.17	3.67	6.50
	mt00	6.07	6.57	-0.50	1.20	3.70	-2.50	4.79	6.24	-1.45	7.12	9.05	-1.93	15.25	11.70	3.55	5.55	5.46	0.09	2.49	3.27	-0.78
	mt05	2.11	2.80	-0.69	0.74	1.49	-0.75	4.56	3.16	1.40	1.72	3.61	-1.89	2.80	3.90	-1.10	2.30	3.51	-1.21	0.52	1.14	-0.62
	nd08	7.74	8.64	-0.90	10.25	4.80	5.45	4.92	12.12	-7.20	15.14	9.21	5.93	6.60	8.96	-2.36	7.38	9.22	-1.84	2.13	7.52	-5.39
	nm07	12.16	7.79	4.37	2.34	3.82	-1.48	16.25	12.80	3.45	16.59	13.15	3.44	8.56	7.62	0.94	16.16	5.21	10.95	13.07	4.15	8.92
	nm08	33.75	14.75	19.00	48.83	10.22	38.61	33.10	26.99	6.11	44.38	23.39	20.99	21.44	12.28	9.16	11.83	8.42	3.41	42.91	7.19	35.72
	nm09	11.48	6.35	5.13	7.21	2.81	4.40	5.83	8.04	-2.21	33.46	12.90	20.56	10.77	6.53	4.24	5.45	5.15	0.30	6.16	2.69	3.47
	ok00	10.51	10.58	-0.07	4.36	8.03	-3.67	12.81	15.76	-2.95	21.44	10.79	10.65	7.44	15.70	-8.26	7.21	9.45	-2.24	9.82	3.76	6.06
	ok17	12.51	11.56	0.95	12.88	5.57	7.31	21.30	15.04	6.26	16.62	12.48	4.14	13.86	20.92	-7.06	5.28	8.93	-3.65	5.14	6.44	-1.30
	or09	1.77	2.49	-0.72	0.83	1.40	-0.57	1.47	3.22	-1.75	2.17	3.85	-1.68	3.96	2.65	1.31	1.69	2.61	-0.92	0.52	1.18	-0.66
	or10	1.24	1.01	0.23	0.50	0.62	-0.12	1.72	1.21	0.51	1.48	1.18	0.30	2.17	1.54	0.63	1.05	0.82	0.23	0.54	0.65	-0.11
	or18	1.77	1.70	0.07	0.54	0.84	-0.30	1.56	2.17	-0.61	3.57	2.68	0.89	2.77	2.63	0.14	1.68	1.13	0.55	0.52	0.77	-0.25
	or97	1.74	1.69	0.05	0.61	1.20	-0.59	2.02	2.54	-0.52	1.45	1.72	-0.27	1.71	1.39	0.32	3.70	2.12	1.58	0.93	1.20	-0.27
	sd08	7.22	6.12	1.10	1.50	1.97	-0.47	12.11	10.16	1.95	7.93	7.74	0.19	11.88	7.09	4.79	5.72	5.63	0.09	4.20	4.15	0.05
	sd99	9.04	10.76	-1.72	3.07	10.42	-7.35	13.61	12.97	0.64	7.15	10.94	-3.79	10.17	11.40	-1.23	15.71	8.57	7.14	4.53	10.24	-5.71

Table A.6 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	13.89	9.60	4.29	12.90	8.00	4.90	23.74	20.21	3.53	18.46	6.90	11.56	8.70	8.28	0.42	4.89	6.50	-1.61	14.64	7.68	6.96
	tx10	8.34	4.99	3.35	5.68	5.15	0.53	15.39	7.31	8.08	14.13	4.98	9.15	6.31	5.28	1.03	4.61	3.30	1.31	3.94	3.90	0.04
	tx16	18.85	19.00	-0.15	10.14	12.48	-2.34	32.83	32.59	0.24	20.77	18.46	2.31	20.51	18.44	2.07	11.73	12.19	-0.46	17.14	19.82	-2.68
	tx21	7.79	4.94	2.85	6.00	3.96	2.04	10.78	8.73	2.05	8.80	4.22	4.58	8.36	6.39	1.97	5.50	3.22	2.28	7.30	3.15	4.15
	tx56	17.63	11.27	6.36	13.00	7.32	5.68	18.35	21.35	-3.00	30.23	8.90	21.33	19.25	15.16	4.09	19.14	6.82	12.32	5.78	8.08	-2.30
	wa14	1.27	1.14	0.13	0.73	1.06	-0.33	1.99	1.25	0.74	1.72	1.79	-0.07	1.06	0.76	0.30	0.91	0.81	0.10	1.21	1.18	0.03
	wa21	1.40	1.07	0.33	0.87	0.62	0.25	1.29	1.27	0.02	3.01	1.26	1.75	1.54	1.34	0.20	1.02	1.06	-0.04	0.65	0.85	-0.20
	wy02	6.67	5.18	1.49	6.21	2.44	3.77	7.70	5.58	2.12	4.70	5.17	-0.47	13.12	11.38	1.74	7.00	4.24	2.76	1.26	2.28	-1.02
	wy08	4.89	8.97	-4.08	1.17	3.30	-2.13	3.97	8.05	-4.08	7.27	20.19	-12.92	7.54	10.59	-3.05	4.66	8.87	-4.21	4.75	2.83	1.92
	wy99	13.84	10.61	3.23	7.57	8.79	-1.22	10.40	11.73	-1.33	12.95	13.25	-0.30	22.46	14.20	8.26	13.25	9.12	4.13	16.40	6.56	9.84

Table A.7. Departures of observed 1995 bi-monthly and annual mean magnesium ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	2.32	1.62	0.70	2.78	0.89	1.89	2.61	2.43	0.18	2.66	2.30	0.36	1.49	1.87	-0.38	3.08	1.46	1.62	1.29	0.74	0.55
	il18	2.64	2.70	-0.06	0.78	1.59	-0.81	3.56	3.55	0.01	3.42	3.97	-0.55	2.99	3.31	-0.32	3.56	2.11	1.45	1.50	1.68	-0.18
	il63	1.67	1.27	0.40	1.68	0.95	0.73	1.46	1.66	-0.20	2.53	1.53	1.00	1.87	1.36	0.51	1.42	1.10	0.32	1.07	1.03	0.04
	in20	4.23	1.90	2.33	2.04	1.36	0.68	3.53	2.02	1.51	7.33	2.63	4.70	5.98	2.20	3.78	3.13	2.16	0.97	3.39	1.03	2.36
	in34	7.36	5.57	1.79	5.69	5.46	0.23	4.79	6.94	-2.15	8.68	6.25	2.43	10.55	6.47	4.08	9.66	4.57	5.09	4.76	3.72	1.04
	in41	4.51	2.25	2.26	5.92	1.70	4.22	10.51	2.35	8.16	3.20	4.08	-0.88	3.70	2.24	1.46	1.60	2.07	-0.47	2.13	1.05	1.08
	ky03	1.33	1.17	0.16	0.62	0.79	-0.17	1.49	1.61	-0.12	1.71	1.33	0.38	1.47	1.31	0.16	1.90	0.97	0.93	0.82	0.99	-0.17
	ky22	1.43	0.72	0.71	0.52	0.65	-0.13	1.66	0.97	0.69	1.54	0.86	0.68	2.96	0.73	2.23	0.97	0.58	0.39	0.92	0.52	0.40
	ky38	1.48	1.12	0.36	0.71	0.77	-0.06	1.09	1.63	-0.54	2.85	1.37	1.48	1.44	1.19	0.25	1.38	0.94	0.44	1.39	0.83	0.56
	ma08	2.43	1.24	1.19	3.78	1.31	2.47	2.48	1.61	0.87	1.26	1.47	-0.21	1.57	0.99	0.58	2.38	0.95	1.43	3.09	1.13	1.96
	ma13	4.39	2.61	1.78	7.22	3.10	4.12	4.92	2.87	2.05	2.32	2.18	0.14	1.52	1.70	-0.18	3.28	2.50	0.78	7.05	3.33	3.72
	md03	1.92	1.33	0.59	3.04	1.16	1.88	2.91	1.64	1.27	2.06	1.59	0.47	1.00	1.08	-0.08	1.72	1.01	0.71	0.77	1.53	-0.76
	md13	2.66	2.17	0.49	1.87	1.66	0.21	4.22	2.77	1.45	2.62	1.99	0.63	2.03	1.83	0.20	2.56	2.09	0.47	2.63	2.68	-0.05
	me00	1.03	0.65	0.38	0.83	0.49	0.34	1.69	1.07	0.62	1.04	0.74	0.30	0.74	0.46	0.28	1.03	0.61	0.42	0.86	0.55	0.31
	me09	1.31	0.60	0.71	0.42	0.47	-0.05	1.24	0.69	0.55	0.69	0.77	-0.08	0.66	0.52	0.14	2.09	0.67	1.42	2.77	0.51	2.26
	mi09	2.94	1.79	1.15	1.52	1.38	0.14	3.00	1.54	1.46	4.75	2.94	1.81	2.21	1.87	0.34	4.26	1.67	2.59	1.91	1.31	0.60
	mi26	3.60	2.11	1.49	1.20	1.98	-0.78	5.21	2.67	2.54	3.66	2.70	0.96	5.90	2.39	3.51	2.69	1.84	0.85	2.92	1.06	1.86
	mi53	3.56	3.11	0.45	3.64	4.15	-0.51	4.18	2.92	1.26	4.77	3.46	1.31	2.52	3.02	-0.50	3.41	2.37	1.04	2.87	2.76	0.11
	mi98	2.09	1.53	0.56	1.05	1.11	-0.06	2.37	2.22	0.15	3.49	2.15	1.34	2.58	1.52	1.06	2.16	1.17	0.99	0.91	0.99	-0.08
	mi99	2.02	1.24	0.78	1.42	1.03	0.39	1.05	1.49	-0.44	1.91	1.64	0.27	3.30	1.47	1.83	2.80	1.14	1.66	1.66	0.69	0.97
	nh02	1.26	0.75	0.51	1.51	0.52	0.99	1.40	0.92	0.48	0.75	1.00	-0.25	0.83	0.61	0.22	1.30	0.87	0.43	1.76	0.60	1.16
	nj99	2.48	2.00	0.48	1.54	1.79	-0.25	3.52	2.30	1.22	2.44	1.67	0.77	1.59	1.55	0.04	3.09	2.27	0.82	2.68	2.41	0.27
	ny08	1.71	1.15	0.56	0.58	0.85	-0.27	2.61	1.17	1.44	2.59	1.69	0.90	2.59	1.52	1.07	1.18	1.06	0.12	0.71	0.57	0.14
	ny20	1.03	0.62	0.41	0.69	0.44	0.25	1.13	0.77	0.36	1.90	0.97	0.93	1.15	0.67	0.48	0.65	0.50	0.15	0.65	0.38	0.27
	ny52	2.48	1.41	1.07	4.33	1.64	2.69	3.17	1.55	1.62	1.71	1.58	0.13	2.54	1.31	1.23	1.67	1.17	0.50	1.49	1.22	0.27
	ny65	1.15	0.75	0.40	0.38	0.40	-0.02	2.05	1.03	1.02	1.58	1.21	0.37	1.46	0.78	0.68	0.90	0.66	0.24	0.52	0.45	0.07
	ny68	1.04	0.90	0.14	0.45	0.73	-0.28	1.46	1.19	0.27	1.22	1.06	0.16	1.03	0.74	0.29	1.26	0.95	0.31	0.83	0.75	0.08
	ny98	1.01	0.65	0.36	0.47	0.38	0.09	1.10	0.83	0.27	1.40	1.06	0.34	1.05	0.62	0.43	1.35	0.62	0.73	0.68	0.43	0.25
	ny99	3.13	1.79	1.34	3.46	1.83	1.63	2.28	2.42	-0.14	3.67	1.45	2.22	1.52	1.44	0.08	3.37	1.82	1.55	4.48	1.81	2.67
	oh17	2.41	1.98	0.43	1.09	1.31	-0.22	3.54	2.45	1.09	2.06	3.00	-0.94	2.75	2.48	0.27	1.38	1.62	-0.24	3.62	1.00	2.62
	oh49	3.06	1.74	1.32	1.22	1.09	0.13	3.03	1.77	1.26	1.82	2.30	-0.48	2.13	2.13	0.00	8.75	2.10	6.65	1.43	1.03	0.40
	oh71	2.31	1.90	0.41	0.80	1.12	-0.32	4.18	2.31	1.87	3.49	3.04	0.45	2.25	2.30	-0.05	1.37	1.70	-0.33	1.79	0.96	0.83
	pa15	1.51	0.96	0.55	0.98	0.71	0.27	2.60	1.06	1.54	1.56	1.22	0.34	2.18	1.13	1.05	1.00	0.99	0.01	0.71	0.66	0.05
	pa29	1.46	1.08	0.38	1.28	0.84	0.44	2.11	1.27	0.84	1.14	1.41	-0.27	1.68	1.16	0.52	1.58	1.16	0.42	0.98	0.66	0.32
	pa42	1.42	1.12	0.30	0.75	0.78	-0.03	2.27	1.22	1.05	1.34	1.39	-0.05	2.12	1.29	0.83	0.97	1.28	-0.31	1.09	0.76	0.33
	pa72	1.50	1.24	0.26	0.66	1.13	-0.47	1.96	1.70	0.26	2.64	1.24	1.40	1.53	1.11	0.42	1.21	1.26	-0.05	1.00	1.02	-0.02
	va00	2.11	1.27	0.84	3.80	1.22	2.58	2.31	1.57	0.74	1.55	1.29	0.26	2.40	0.87	1.53	1.24	1.06	0.18	1.37	1.63	-0.26
	va13	1.56	1.16	0.40	0.57	0.77	-0.20	3.12	1.24	1.88	2.00	1.55	0.45	1.51	1.22	0.29	1.50	1.56	-0.06	0.68	0.63	0.05
	va28	1.75	0.58	1.17	5.40	0.43	4.97	1.23	0.76	0.47	1.07	0.62	0.45	0.96	0.55	0.41	0.90	0.65	0.25	0.94	0.45	0.49
	vt01	1.38	1.31	0.07	1.33	1.40	-0.07	1.56	1.62	-0.06	1.87	1.52	0.35	1.39	1.05	0.34	0.87	1.30	-0.43	1.24	0.99	0.25
	vt99	1.10	0.70	0.40	0.67	0.50	0.17	1.20	0.84	0.36	1.21	1.04	0.17	0.77	0.64	0.13	1.96	0.70	1.26	0.78	0.51	0.27
	wi28	2.43	1.71	0.72	2.21	1.10	1.11	1.60	2.18	-0.58	3.08	2.57	0.51	3.06	2.07	0.99	2.49	1.57	0.92	2.15	0.75	1.40
	wi36	1.66	1.27	0.39	1.92	0.78	1.14	1.43	1.76	-0.33	2.85	1.90	0.95	1.39	1.35	0.04	1.68	1.22	0.46	0.68	0.62	0.06
	wi37	2.68	1.62	1.06	1.86	0.86	1.00	2.17	1.42	0.75	2.75	2.80	-0.05	2.12	1.91	0.21	6.76	1.89	4.87	0.44	0.86	-0.42
	wi99	3.61	2.84	0.77	1.12	1.76	-0.64	2.74	3.23	-0.49	6.43	3.98	2.45	4.69	3.94	0.75	5.12	2.61	2.51	1.56	1.54	0.02
	wv04	1.20	0.66	0.54	0.66	0.54	0.12	1.79	0.99	0.80	1.79	0.77	1.02	1.03	0.54	0.49	1.00	0.62	0.38	0.95	0.49	0.46
	wv18	1.40	1.05	0.35	1.09	0.94	0.15	2.21	1.26	0.95	1.74	1.36	0.38	1.35	1.13	0.22	0.81	0.89	-0.08	1.20	0.71	0.49

Table A.7 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	1.52	1.31	0.21	2.03	1.55	0.48	2.03	1.71	0.32	1.16	1.40	-0.24	1.46	1.09	0.37	0.90	0.87	0.03	1.56	1.22	0.34
	fl03	3.01	2.62	0.39	4.31	3.10	1.21	1.82	3.14	-1.32	3.23	1.87	1.36	1.74	1.69	0.05	4.75	2.17	2.58	2.19	3.78	-1.59
	fl11	6.61	7.49	-0.88	6.22	10.74	-4.52	9.93	8.79	1.14	3.89	3.90	-0.01	3.81	5.35	-1.54	5.99	5.97	0.02	9.84	10.16	-0.32
	fl41	3.84	3.52	0.32	5.15	4.54	0.61	2.78	4.02	-1.24	3.02	2.94	0.08	2.68	2.71	-0.03	4.42	2.53	1.89	5.01	4.39	0.62
	ga41	1.85	1.19	0.66	1.92	1.29	0.63	2.22	1.32	0.90	1.86	1.65	0.21	1.83	0.76	1.07	1.21	1.06	0.15	2.06	1.08	0.98
	ms10	2.10	1.51	0.59	3.31	1.28	2.03	2.36	2.28	0.08	1.87	1.47	0.40	1.89	1.20	0.69	0.87	1.29	-0.42	2.29	1.56	0.73
	ms30	1.62	1.15	0.47	1.69	1.23	0.46	1.86	1.75	0.11	1.68	1.08	0.60	1.39	0.98	0.41	2.19	0.82	1.37	0.94	1.07	-0.13
	nc03	3.41	2.37	1.04	5.94	2.36	3.58	4.82	3.53	1.29	1.57	1.81	-0.24	2.11	0.94	1.17	2.52	2.05	0.47	3.52	3.55	-0.03
	nc25	0.96	0.88	0.08	0.80	0.84	-0.04	1.57	1.41	0.16	1.14	1.03	0.11	0.99	0.58	0.41	0.79	0.54	0.25	0.48	0.89	-0.41
	nc34	1.82	1.50	0.32	2.48	1.25	1.23	3.12	1.94	1.18	1.38	1.69	-0.31	1.06	1.33	-0.27	1.45	1.26	0.19	1.43	1.55	-0.12
	nc36	3.08	2.10	0.98	3.64	2.61	1.03	5.56	2.94	2.62	1.47	1.74	-0.27	1.25	0.93	0.32	2.46	1.94	0.52	4.09	2.43	1.66
	nc41	2.65	1.84	0.81	4.79	1.78	3.01	3.01	2.43	0.58	1.84	1.43	0.41	1.49	1.19	0.30	1.89	1.66	0.23	2.85	2.56	0.29
	sc06	2.71	3.17	-0.46	3.69	2.96	0.73	3.15	4.46	-1.31	1.85	2.92	-1.07	2.09	2.07	0.02	3.27	2.87	0.40	2.18	3.72	-1.54
	tn00	1.78	0.85	0.93	0.90	0.65	0.25	1.78	1.19	0.59	3.74	1.06	2.68	2.21	0.83	1.38	0.83	0.67	0.16	1.24	0.68	0.56
	tn11	0.92	0.69	0.23	0.58	0.42	0.16	1.20	0.84	0.36	1.47	0.96	0.51	0.85	0.60	0.25	0.46	0.85	-0.39	0.94	0.45	0.49
West	ar02	2.19	1.76	0.43	1.58	1.57	0.01	2.07	2.10	-0.03	2.84	2.01	0.83	1.75	1.78	-0.03	3.47	1.43	2.04	1.43	1.67	-0.24
	ar03	1.99	1.68	0.31	1.66	1.37	0.29	2.86	2.03	0.83	2.31	2.08	0.23	1.98	1.77	0.21	2.00	1.24	0.76	1.13	1.57	-0.44
	ar27	1.49	1.28	0.21	0.46	0.85	-0.39	2.04	1.69	0.35	1.97	1.43	0.54	1.83	1.60	0.23	1.31	1.05	0.26	1.30	1.05	0.25
	az03	3.76	2.99	0.77	0.61	1.28	-0.67	1.22	2.13	-0.91	9.38	6.05	3.33	5.99	4.54	1.45	3.39	2.12	1.27	1.97	1.82	0.15
	co00	1.92	0.79	1.13	0.64	0.46	0.18	4.90	1.01	3.89	2.92	1.29	1.63	1.25	0.81	0.44	1.16	0.63	0.53	0.66	0.58	0.08
	co02	2.77	1.22	1.55	0.50	0.66	-0.16	1.62	1.58	0.04	4.55	1.42	3.13	2.17	1.48	0.69	6.15	1.02	5.13	1.60	1.13	0.47
	co15	2.13	1.49	0.64	1.17	0.97	0.20	1.62	1.65	-0.03	2.07	2.31	-0.24	3.98	2.19	1.79	2.44	1.14	1.30	1.48	0.68	0.80
	co19	1.38	0.99	0.39	0.52	0.44	0.08	1.15	0.79	0.36	1.10	1.58	-0.48	2.18	1.64	0.54	2.61	1.04	1.57	0.74	0.45	0.29
	co22	1.49	0.83	0.66	0.47	0.70	-0.23	1.96	0.99	0.97	1.32	1.22	0.10	3.18	0.91	2.27	1.27	0.85	0.42	0.77	0.34	0.43
	co97	1.25	1.05	0.20	0.47	0.79	-0.32	1.42	1.38	0.04	1.26	1.67	-0.41	1.56	1.17	0.39	1.89	0.75	1.14	0.92	0.57	0.35
	co98	1.13	0.84	0.29	0.63	0.31	0.32	0.95	0.93	0.02	1.35	1.77	-0.42	1.35	1.01	0.34	1.82	0.68	1.14	0.66	0.35	0.31
	co99	2.74	2.08	0.66	1.03	1.28	-0.25	0.96	3.09	-2.13	4.91	3.07	1.84	2.97	1.98	0.99	0.94	1.96	-1.02	5.63	1.09	4.54
	ia08	6.58	4.44	2.14	5.96	2.41	3.55	4.41	4.24	0.17	12.27	6.88	5.39	8.91	4.64	4.27	5.00	3.71	1.29	2.95	4.75	-1.80
	ia23	2.41	1.81	0.60	0.90	0.84	0.06	3.65	2.64	1.01	2.43	3.16	-0.73	2.73	1.93	0.80	1.74	1.22	0.52	2.98	1.05	1.93
	id03	2.81	1.12	1.69	0.48	0.50	-0.02	1.39	1.19	0.20	1.88	1.80	0.08	4.93	1.82	3.11	3.64	1.05	2.59	4.55	0.37	4.18
	id11	1.59	1.34	0.25	0.36	0.55	-0.19	2.24	1.06	1.18	1.20	1.51	-0.31	2.81	3.16	-0.35	2.51	1.14	1.37	0.44	0.60	-0.16
	ks31	1.72	1.66	0.06	0.89	0.96	-0.07	2.01	1.91	0.10	2.13	2.00	0.13	1.47	1.93	-0.46	1.58	1.88	-0.30	2.26	1.28	0.98
	ks32	2.29	1.42	0.87	0.80	0.76	0.04	4.01	1.63	2.38	2.91	1.85	1.06	1.76	1.83	-0.07	3.52	1.44	2.08	0.74	1.03	-0.29
	la12	3.85	2.91	0.94	5.39	3.07	2.32	5.30	4.06	1.24	4.45	2.49	1.96	2.80	2.44	0.36	1.91	2.59	-0.68	3.25	2.82	0.43
	la30	2.94	2.16	0.78	3.68	2.77	0.91	3.60	3.03	0.57	2.42	1.67	0.75	2.35	1.62	0.73	2.93	1.56	1.37	2.66	2.31	0.35
	mn16	1.41	1.49	-0.08	0.60	1.14	-0.54	1.49	1.48	0.01	2.05	1.96	0.09	1.76	1.70	0.06	1.20	1.44	-0.24	1.38	1.20	0.18
	mn23	1.91	1.73	0.18	1.15	0.89	0.26	2.10	1.44	0.66	2.31	2.52	-0.21	3.47	2.53	0.94	0.92	1.46	-0.54	1.53	1.55	-0.02
	mo03	2.31	1.60	0.71	1.05	1.06	-0.01	2.19	1.94	0.25	2.03	2.12	-0.09	2.32	2.03	0.29	3.56	1.46	2.10	2.68	1.01	1.67
	mt00	1.31	1.25	0.06	0.27	0.65	-0.38	1.12	1.10	0.02	1.07	1.77	-0.70	3.56	2.41	1.15	1.30	1.00	0.30	0.53	0.59	-0.06
	mt05	0.59	0.63	-0.04	0.27	0.33	-0.06	1.06	0.66	0.40	0.38	0.82	-0.44	0.94	0.83	0.11	0.62	0.82	-0.20	0.25	0.34	-0.09
	nd08	2.64	2.89	-0.25	2.54	1.37	1.17	1.50	3.67	-2.17	5.80	3.27	2.53	2.78	3.47	-0.69	2.56	3.33	-0.77	0.67	2.24	-1.57
	nm07	1.61	0.87	0.74	0.37	0.49	-0.12	2.30	1.29	1.01	2.49	1.54	0.95	1.48	0.80	0.68	1.46	0.57	0.89	1.55	0.52	1.03
	nm08	3.65	1.44	2.21	3.48	1.08	2.40	4.39	3.05	1.34	3.90	1.95	1.95	2.26	0.98	1.28	1.20	0.78	0.42	6.70	0.81	5.89
	nm09	1.56	0.88	0.68	1.00	0.44	0.56	1.01	0.99	0.02	3.37	1.69	1.68	1.59	0.92	0.67	1.34	0.83	0.51	1.07	0.43	0.64
	ok00	1.59	1.46	0.13	0.55	1.07	-0.52	1.92	1.98	-0.06	3.34	1.60	1.74	1.31	2.15	-0.84	1.40	1.40	0.00	1.03	0.58	0.45
	ok17	2.03	2.13	-0.10	1.64	0.91	0.73	2.84	2.43	0.41	3.62	2.25	1.37	2.29	3.99	-1.70	1.12	1.52	-0.40	0.64	1.67	-1.03
	or09	0.70	0.67	0.03	0.29	0.44	-0.15	0.48	0.78	-0.30	0.66	1.02	-0.36	1.74	0.71	1.03	0.79	0.69	0.10	0.25	0.39	-0.14
	or10	1.32	1.06	0.26	0.28	1.06	-0.78	1.61	1.20	0.41	1.55	0.76	0.79	1.51	0.84	0.67	1.77	0.92	0.85	1.19	1.57	-0.38
	or18	0.56	0.41	0.15	0.26	0.26	0.00	0.49	0.49	0.00	0.88	0.58	0.30	0.94	0.58	0.36	0.52	0.29	0.23	0.26	0.27	-0.01
	or97	1.85	2.32	-0.47	0.47	2.78	-2.31	2.73	3.14	-0.41	1.51	1.33	0.18	1.45	1.03	0.42	1.49	2.18	-0.69	3.47	3.45	0.02
	sd08	1.27	0.93	0.34	0.31	0.37	-0.06	1.85	1.50	0.35	1.43	1.07	0.36	2.09	1.00	1.09	1.04	1.03	0.01	0.90	0.57	0.33
	sd99	2.02	2.63	-0.61	0.91	3.05	-2.14	2.20	3.12	-0.92	1.76	2.60	-0.84	2.55	2.72	-0.17	2.99	2.12	0.87	1.74	2.19	-0.45

Table A.7 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	6.67	4.67	2.00	10.17	3.96	6.21	7.83	5.95	1.88	10.44	4.32	6.12	4.65	3.96	0.69	3.70	4.08	-0.38	3.22	5.77	-2.55
	tx10	3.51	2.94	0.57	4.94	2.95	1.99	5.13	3.33	1.80	3.39	2.67	0.72	2.98	2.27	0.71	2.51	2.49	0.02	2.13	3.93	-1.80
	tx16	2.65	2.06	0.59	2.14	1.59	0.55	3.55	3.20	0.35	2.82	2.17	0.65	3.29	2.07	1.22	1.72	1.65	0.07	2.35	1.65	0.70
	tx21	2.19	1.94	0.25	1.75	1.67	0.08	2.57	2.56	0.01	2.07	1.77	0.30	3.68	2.05	1.63	1.45	1.47	-0.02	1.60	2.10	-0.50
	tx56	2.07	1.47	0.60	1.49	1.12	0.37	2.68	2.77	-0.09	3.78	1.39	2.39	1.75	1.34	0.41	1.81	0.94	0.87	0.90	1.24	-0.34
	wa14	3.73	3.11	0.62	2.97	4.19	-1.22	5.82	3.10	2.72	3.30	3.31	-0.01	2.19	1.25	0.94	3.02	1.87	1.15	5.08	4.95	0.13
	wa21	1.61	0.98	0.63	0.78	0.92	-0.14	1.19	1.11	0.08	2.66	0.89	1.77	1.53	0.64	0.89	1.46	0.88	0.58	2.02	1.43	0.59
	wy02	1.56	0.89	0.67	1.13	0.50	0.63	1.57	0.87	0.70	1.04	0.79	0.25	3.13	2.07	1.06	1.95	0.72	1.23	0.52	0.36	0.16
	wy08	0.97	1.31	-0.34	0.31	0.48	-0.17	0.67	1.06	-0.39	1.52	2.73	-1.21	1.70	1.81	-0.11	0.95	1.39	-0.44	0.67	0.38	0.29
	wy99	2.08	1.30	0.78	0.92	0.95	-0.03	1.47	1.47	0.00	1.81	1.73	0.08	3.53	1.67	1.86	2.01	1.18	0.83	2.72	0.80	1.92

Table A.8. Departures of observed 1995 bi-monthly and annual mean potassium ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	0.57	0.36	0.21	0.56	0.16	0.40	0.60	0.48	0.12	1.08	0.60	0.48	0.33	0.42	-0.09	0.66	0.35	0.31	0.20	0.17	0.03
	il18	0.41	0.56	-0.15	0.19	0.17	0.02	0.60	0.69	-0.09	0.46	1.10	-0.64	0.31	0.56	-0.25	0.54	0.57	-0.03	0.36	0.28	0.08
	il63	0.91	0.47	0.44	1.61	0.27	1.34	0.56	0.64	-0.08	1.12	0.96	0.16	1.47	0.40	1.07	0.41	0.30	0.11	0.28	0.25	0.03
	in20	1.10	0.27	0.83	0.31	0.20	0.11	0.52	0.27	0.25	1.03	0.37	0.66	0.59	0.27	0.32	0.95	0.31	0.64	3.21	0.20	3.01
	in34	0.65	0.39	0.26	0.50	0.34	0.16	0.60	0.48	0.12	0.90	0.51	0.39	0.65	0.38	0.27	0.79	0.36	0.43	0.45	0.27	0.18
	in41	0.72	0.34	0.38	1.00	0.21	0.79	1.33	0.36	0.97	0.79	0.55	0.24	0.43	0.32	0.11	0.24	0.38	-0.14	0.55	0.23	0.32
	ky03	0.72	0.40	0.32	0.21	0.20	0.01	0.53	0.55	-0.02	0.89	0.60	0.29	0.31	0.46	-0.15	2.19	0.33	1.86	0.18	0.27	-0.09
	ky22	0.50	0.28	0.22	0.18	0.16	0.02	0.68	0.39	0.29	0.84	0.44	0.40	0.69	0.28	0.41	0.36	0.21	0.15	0.22	0.17	0.05
	ky38	0.61	0.56	0.05	0.31	0.28	0.03	0.61	0.96	-0.35	1.53	0.98	0.55	0.25	0.46	-0.21	0.55	0.41	0.14	0.39	0.26	0.13
	ma08	0.95	0.27	0.68	0.47	0.19	0.28	0.48	0.25	0.23	0.61	0.51	0.10	0.57	0.23	0.34	3.28	0.21	3.07	0.31	0.22	0.09
	ma13	1.01	0.50	0.51	0.93	0.44	0.49	0.83	0.48	0.35	0.84	0.72	0.12	0.46	0.35	0.11	0.32	0.48	-0.16	2.68	0.51	2.17
	md03	0.47	0.40	0.07	0.35	0.32	0.03	0.97	0.47	0.50	0.74	0.66	0.08	0.31	0.33	-0.02	0.24	0.25	-0.01	0.20	0.34	-0.14
	md13	0.59	0.45	0.14	0.32	0.26	0.06	1.10	0.64	0.46	0.72	0.56	0.16	0.55	0.49	0.06	0.33	0.33	0.00	0.52	0.44	0.08
	me00	0.21	0.24	-0.03	0.12	0.16	-0.04	0.35	0.27	0.08	0.23	0.35	-0.12	0.21	0.25	-0.04	0.19	0.19	0.00	0.14	0.21	-0.07
	me09	0.28	0.23	0.05	0.12	0.15	-0.03	0.25	0.18	0.07	0.24	0.41	-0.17	0.31	0.28	0.03	0.37	0.20	0.17	0.37	0.15	0.22
	mi09	0.50	0.38	0.12	0.23	0.25	-0.02	0.39	0.29	0.10	0.79	0.68	0.11	0.42	0.36	0.06	0.82	0.41	0.41	0.32	0.27	0.05
	mi26	0.69	0.40	0.29	0.26	0.30	-0.04	0.68	0.46	0.22	1.00	0.62	0.38	1.12	0.36	0.76	0.41	0.37	0.04	0.64	0.28	0.36
	mi53	0.45	0.38	0.07	0.26	0.23	0.03	0.51	0.38	0.13	0.98	0.65	0.33	0.32	0.34	-0.02	0.40	0.38	0.02	0.24	0.30	-0.06
	mi98	0.30	0.35	-0.05	0.19	0.21	-0.02	0.21	0.42	-0.21	0.52	0.57	-0.05	0.31	0.36	-0.05	0.33	0.28	0.05	0.22	0.25	-0.03
	mi99	0.61	0.33	0.28	0.24	0.22	0.02	0.18	0.30	-0.12	0.34	0.50	-0.16	0.78	0.39	0.39	1.77	0.37	1.40	0.37	0.22	0.15
	nh02	0.35	0.24	0.11	0.41	0.12	0.29	0.32	0.20	0.12	0.41	0.51	-0.10	0.42	0.23	0.19	0.25	0.22	0.03	0.30	0.17	0.13
	nj99	0.43	0.30	0.13	0.24	0.23	0.01	0.66	0.34	0.32	0.72	0.38	0.34	0.20	0.24	-0.04	0.33	0.35	-0.02	0.45	0.28	0.17
	ny08	0.36	0.20	0.16	0.22	0.11	0.11	0.47	0.17	0.30	0.51	0.34	0.17	0.65	0.24	0.41	0.19	0.19	0.00	0.14	0.13	0.01
	ny20	0.48	0.17	0.31	0.41	0.11	0.30	0.22	0.16	0.06	0.70	0.32	0.38	0.24	0.18	0.06	0.14	0.13	0.01	1.17	0.10	1.07
	ny52	1.15	0.33	0.82	1.24	0.24	1.00	0.79	0.30	0.49	1.00	0.46	0.54	2.00	0.33	1.67	0.99	0.31	0.68	0.87	0.32	0.55
	ny65	0.30	0.18	0.12	0.16	0.09	0.07	0.38	0.21	0.17	0.51	0.30	0.21	0.32	0.23	0.09	0.17	0.15	0.02	0.28	0.10	0.18
	ny68	0.32	0.34	-0.02	0.17	0.20	-0.03	0.46	0.32	0.14	0.52	0.50	0.02	0.30	0.27	0.03	0.29	0.52	-0.23	0.18	0.25	-0.07
	ny98	0.55	0.32	0.23	0.16	0.15	0.01	0.23	0.23	0.00	0.57	0.52	0.05	0.27	0.24	0.03	1.44	0.56	0.88	0.60	0.24	0.36
	ny99	0.75	0.48	0.27	0.40	0.34	0.06	0.47	0.57	-0.10	1.72	0.58	1.14	0.31	0.59	-0.28	1.20	0.46	0.74	0.39	0.37	0.02
	oh17	0.56	0.50	0.06	0.20	0.29	-0.09	0.89	0.74	0.15	1.16	0.86	0.30	0.35	0.47	-0.12	0.35	0.42	-0.07	0.43	0.24	0.19
	oh49	0.86	0.64	0.22	0.26	0.29	-0.03	0.79	0.62	0.17	0.95	1.01	-0.06	0.54	0.66	-0.12	2.15	0.90	1.25	0.45	0.33	0.12
	oh71	0.45	0.35	0.10	0.17	0.19	-0.02	0.70	0.38	0.32	1.02	0.60	0.42	0.36	0.40	-0.04	0.25	0.33	-0.08	0.20	0.18	0.02
	pa15	0.62	0.34	0.28	0.13	0.16	-0.03	0.49	0.32	0.17	1.25	0.51	0.74	0.66	0.51	0.15	1.00	0.35	0.65	0.21	0.16	0.05
	pa29	0.97	0.41	0.56	0.28	0.18	0.10	0.49	0.40	0.09	0.51	0.71	-0.20	0.59	0.43	0.16	3.75	0.49	3.26	0.22	0.24	-0.02
	pa42	0.52	0.36	0.16	0.15	0.26	-0.11	0.51	0.36	0.15	0.86	0.55	0.31	0.86	0.35	0.51	0.54	0.43	0.11	0.21	0.24	-0.03
	pa72	0.46	0.29	0.17	0.19	0.19	0.00	0.39	0.27	0.12	1.18	0.47	0.71	0.64	0.24	0.40	0.21	0.39	-0.18	0.13	0.19	-0.06
	va00	0.58	0.36	0.22	0.48	0.23	0.25	0.67	0.48	0.19	1.25	0.57	0.68	0.61	0.41	0.20	0.21	0.28	-0.07	0.24	0.22	0.02
	va13	1.61	0.93	0.68	0.40	0.27	0.13	2.68	0.75	1.93	2.71	1.64	1.07	0.53	0.80	-0.27	2.99	1.56	1.43	0.33	0.57	-0.24
	va28	0.31	0.26	0.05	0.60	0.17	0.43	0.28	0.32	-0.04	0.42	0.39	0.03	0.23	0.22	0.01	0.16	0.27	-0.11	0.16	0.16	0.00
	vt01	0.40	0.33	0.07	0.35	0.23	0.12	0.31	0.32	-0.01	0.81	0.56	0.25	0.40	0.23	0.17	0.20	0.42	-0.22	0.30	0.24	0.06
	vt99	0.60	0.31	0.29	0.24	0.19	0.05	0.28	0.25	0.03	0.55	0.57	-0.02	0.21	0.26	-0.05	1.92	0.36	1.56	0.39	0.24	0.15
	wi28	0.66	0.38	0.28	0.61	0.31	0.30	0.29	0.36	-0.07	1.70	0.67	1.03	0.51	0.38	0.13	0.54	0.36	0.18	0.34	0.24	0.10
	wi36	0.32	0.25	0.07	0.22	0.12	0.10	0.24	0.30	-0.06	0.65	0.47	0.18	0.29	0.24	0.05	0.35	0.22	0.13	0.17	0.15	0.02
	wi37	1.08	0.32	0.76	0.40	0.16	0.24	0.36	0.28	0.08	1.17	0.51	0.66	1.24	0.30	0.94	3.11	0.49	2.62	0.22	0.20	0.02
	wi99	0.61	0.50	0.11	0.12	0.25	-0.13	0.68	0.47	0.21	0.94	0.72	0.22	0.59	0.78	-0.19	0.87	0.49	0.38	0.47	0.30	0.17
	wv04	0.52	0.32	0.20	0.18	0.20	-0.02	0.63	0.39	0.24	1.18	0.45	0.73	0.22	0.23	-0.01	0.48	0.43	0.05	0.44	0.24	0.20
	wv18	0.46	0.43	0.03	0.41	0.43	-0.02	0.53	0.51	0.02	0.97	0.57	0.40	0.24	0.45	-0.21	0.20	0.32	-0.12	0.39	0.30	0.09

Table A.8 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	0.42	0.48	-0.06	0.48	0.34	0.14	0.79	0.70	0.09	0.40	0.61	-0.21	0.34	0.60	-0.26	0.29	0.34	-0.05	0.23	0.27	-0.04
	fl03	0.55	0.41	0.14	0.72	0.53	0.19	0.72	0.50	0.22	0.65	0.40	0.25	0.35	0.27	0.08	0.53	0.29	0.24	0.33	0.47	-0.14
	fl11	2.75	1.77	0.98	0.81	1.41	-0.60	1.32	1.51	-0.19	0.54	0.77	-0.23	4.03	3.15	0.88	8.68	2.12	6.56	1.12	1.64	-0.52
	fl41	1.04	0.59	0.45	1.14	0.58	0.56	1.00	0.77	0.23	0.34	0.70	-0.36	0.38	0.50	-0.12	2.74	0.36	2.38	0.64	0.66	-0.02
	ga41	1.69	0.70	0.99	0.95	0.59	0.36	0.98	0.74	0.24	6.05	1.09	4.96	1.30	0.46	0.84	0.25	0.78	-0.53	0.59	0.51	0.08
	ms10	0.60	0.50	0.10	0.62	0.39	0.23	1.03	0.91	0.12	0.94	0.63	0.31	0.44	0.28	0.16	0.28	0.44	-0.16	0.30	0.36	-0.06
	ms30	0.70	0.47	0.23	0.48	0.38	0.10	0.79	0.85	-0.06	1.56	0.50	1.06	0.44	0.30	0.14	0.67	0.39	0.28	0.24	0.39	-0.15
	nc03	0.66	0.57	0.09	0.70	0.45	0.25	1.14	1.01	0.13	0.64	0.62	0.02	0.56	0.30	0.26	0.36	0.44	-0.08	0.53	0.62	-0.09
	nc25	0.59	0.42	0.17	0.24	0.24	0.00	0.61	0.60	0.01	0.94	0.86	0.08	0.70	0.24	0.46	0.92	0.32	0.60	0.12	0.22	-0.10
	nc34	1.19	0.78	0.41	0.45	0.32	0.13	3.33	1.01	2.32	0.85	1.38	-0.53	0.34	0.95	-0.61	0.96	0.47	0.49	1.21	0.55	0.66
	nc36	0.56	0.45	0.11	0.53	0.47	0.06	1.18	0.77	0.41	0.55	0.58	-0.03	0.27	0.21	0.06	0.25	0.33	-0.08	0.55	0.34	0.21
	nc41	0.48	0.79	-0.31	0.57	0.47	0.10	0.68	1.00	-0.32	0.57	0.91	-0.34	0.34	1.12	-0.78	0.26	0.60	-0.34	0.44	0.64	-0.20
	sc06	2.87	2.00	0.87	0.67	1.16	-0.49	0.88	2.19	-1.31	0.50	3.08	-2.58	4.59	2.11	2.48	8.90	2.01	6.89	1.67	1.47	0.20
	tn00	1.12	0.34	0.78	0.71	0.20	0.51	0.77	0.62	0.15	3.63	0.56	3.07	0.60	0.28	0.32	0.26	0.21	0.05	0.76	0.20	0.56
	tn11	0.52	0.43	0.09	0.36	0.20	0.16	0.62	0.39	0.23	1.03	0.60	0.43	0.26	0.27	-0.01	0.54	0.87	-0.33	0.29	0.23	0.06
West	ar02	1.93	1.04	0.89	0.50	0.80	-0.30	3.70	1.44	2.26	1.10	1.46	-0.36	0.66	1.06	-0.40	3.45	0.85	2.60	2.16	0.60	1.56
	ar03	1.16	0.92	0.24	0.60	0.54	0.06	1.70	1.41	0.29	0.97	1.55	-0.58	1.29	0.87	0.42	1.96	0.49	1.47	0.43	0.67	-0.24
	ar27	0.58	0.66	-0.08	0.23	0.33	-0.10	0.72	0.99	-0.27	0.87	0.85	0.02	0.74	0.82	-0.08	0.49	0.43	0.06	0.43	0.53	-0.10
	az03	0.53	0.37	0.16	0.14	0.14	0.00	0.22	0.25	-0.03	1.58	0.81	0.77	0.70	0.50	0.20	0.17	0.33	-0.16	0.37	0.21	0.16
	co00	0.83	0.50	0.33	0.45	0.28	0.17	2.14	0.43	1.71	1.01	1.04	-0.03	0.65	0.57	0.08	0.42	0.34	0.08	0.31	0.33	-0.02
	co02	0.87	0.45	0.42	0.23	0.30	-0.07	0.25	0.42	-0.17	1.03	0.52	0.51	1.05	0.58	0.47	1.40	0.35	1.05	1.25	0.53	0.72
	co15	1.51	0.36	1.15	0.15	0.18	-0.03	6.86	0.28	6.58	0.42	0.69	-0.27	0.73	0.58	0.15	0.55	0.25	0.30	0.32	0.21	0.11
	co19	0.56	0.72	-0.16	0.09	0.19	-0.10	0.21	0.44	-0.23	0.34	1.55	-1.21	1.56	0.99	0.57	0.84	0.95	-0.11	0.34	0.22	0.12
	co22	0.68	0.45	0.23	0.30	0.16	0.14	0.41	0.54	-0.13	0.39	0.72	-0.33	2.11	0.75	1.36	0.50	0.43	0.07	0.39	0.12	0.27
	co97	0.28	0.46	-0.18	0.10	0.24	-0.14	0.21	0.35	-0.14	0.25	1.34	-1.09	0.43	0.38	0.05	0.45	0.26	0.19	0.23	0.16	0.07
	co98	0.47	0.33	0.14	0.38	0.13	0.25	0.12	0.25	-0.13	0.32	0.66	-0.34	1.06	0.56	0.50	0.61	0.28	0.33	0.32	0.14	0.18
	co99	0.85	0.36	0.49	0.13	0.20	-0.07	0.20	0.41	-0.21	2.92	0.70	2.22	0.70	0.33	0.37	0.14	0.31	-0.17	1.03	0.22	0.81
	ia08	2.88	0.82	2.06	0.57	0.40	0.17	1.22	1.22	0.00	4.88	1.33	3.55	8.87	0.51	8.36	1.23	0.73	0.50	0.48	0.75	-0.27
	ia23	0.98	0.57	0.41	0.25	0.23	0.02	0.80	0.63	0.17	1.46	1.29	0.17	1.80	0.63	1.17	0.49	0.32	0.17	1.05	0.32	0.73
	id03	1.18	0.36	0.82	0.25	0.11	0.14	0.40	0.22	0.18	0.32	0.57	-0.25	3.19	0.69	2.50	2.34	0.41	1.93	0.58	0.14	0.44
	id11	0.78	0.72	0.06	0.10	0.25	-0.15	0.67	0.39	0.28	0.48	0.66	-0.18	1.40	1.87	-0.47	1.73	0.65	1.08	0.31	0.53	-0.22
	ks31	0.62	0.54	0.08	0.46	0.26	0.20	0.56	0.55	0.01	0.84	0.86	-0.02	0.75	0.62	0.13	0.42	0.55	-0.13	0.66	0.40	0.26
	ks32	1.01	0.85	0.16	0.42	0.39	0.03	1.16	0.65	0.51	1.13	1.14	-0.01	1.81	1.42	0.39	1.29	0.88	0.41	0.28	0.61	-0.33
	la12	0.84	0.58	0.26	0.83	0.47	0.36	1.32	1.01	0.31	1.53	0.57	0.96	0.47	0.48	-0.01	0.36	0.50	-0.14	0.51	0.43	0.08
	la30	0.71	0.46	0.25	0.58	0.46	0.12	1.05	0.86	0.19	1.24	0.50	0.74	0.54	0.34	0.20	0.45	0.28	0.17	0.42	0.32	0.10
	mn16	0.42	0.44	-0.02	0.15	0.31	-0.16	0.40	0.53	-0.13	0.73	0.69	0.04	0.69	0.39	0.30	0.27	0.42	-0.15	0.29	0.32	-0.03
	mn23	0.46	0.40	0.06	0.22	0.19	0.03	0.54	0.42	0.12	0.45	0.53	-0.08	0.96	0.40	0.56	0.20	0.36	-0.16	0.38	0.53	-0.15
	mo03	0.69	0.45	0.24	0.19	0.24	-0.05	1.00	0.56	0.44	1.16	0.79	0.37	0.40	0.43	-0.03	0.74	0.42	0.32	0.64	0.24	0.40
	mt00	0.64	0.44	0.20	0.14	0.20	-0.06	0.77	0.27	0.50	0.33	0.49	-0.16	1.94	1.11	0.83	0.48	0.41	0.07	0.16	0.19	-0.03
	mt05	0.34	0.52	-0.18	0.10	0.16	-0.06	0.46	0.35	0.11	0.31	0.85	-0.54	0.79	0.75	0.04	0.31	0.80	-0.49	0.09	0.21	-0.12
	nd08	0.56	0.65	-0.09	0.49	0.26	0.23	0.31	0.62	-0.31	1.04	0.72	0.32	0.42	1.03	-0.61	0.46	0.77	-0.31	0.66	0.49	0.17
	nm07	0.43	0.28	0.15	0.16	0.13	0.03	0.48	0.29	0.19	0.62	0.63	-0.01	0.47	0.24	0.23	0.33	0.17	0.16	0.54	0.22	0.32
	nm08	1.86	0.35	1.51	0.90	0.32	0.58	2.43	0.54	1.89	1.32	0.61	0.71	0.39	0.25	0.14	0.31	0.21	0.10	5.79	0.18	5.61
	nm09	0.43	0.30	0.13	0.27	0.14	0.13	0.21	0.21	0.00	0.94	0.78	0.16	0.53	0.27	0.26	0.34	0.24	0.10	0.31	0.15	0.16
	ok00	0.57	0.73	-0.16	0.10	0.32	-0.22	0.54	0.97	-0.43	1.51	1.00	0.51	0.32	1.07	-0.75	0.53	0.63	-0.10	0.41	0.39	0.02
	ok17	1.05	1.13	-0.08	0.68	0.40	0.28	1.53	1.38	0.15	1.95	1.41	0.54	1.17	1.87	-0.70	0.76	0.83	-0.07	0.23	0.89	-0.66
	or09	0.41	0.30	0.11	0.32	0.22	0.10	0.12	0.25	-0.13	0.30	0.39	-0.09	1.28	0.34	0.94	0.35	0.42	-0.07	0.09	0.16	-0.07
	or10	0.38	0.24	0.14	0.09	0.14	-0.05	0.28	0.25	0.03	0.31	0.22	0.09	1.00	0.33	0.67	0.32	0.30	0.02	0.25	0.22	0.03
	or18	0.27	0.32	-0.05	0.13	0.13	0.00	0.14	0.21	-0.07	0.42	0.50	-0.08	0.49	0.64	-0.15	0.33	0.28	0.05	0.10	0.14	-0.04
	or97	0.33	0.54	-0.21	0.11	0.40	-0.29	0.39	0.59	-0.20	0.35	0.38	-0.03	0.48	0.70	-0.22	0.27	0.70	-0.43	0.38	0.45	-0.07
	sd08	0.54	0.33	0.21	0.12	0.13	-0.01	0.91	0.34	0.57	0.38	0.45	-0.07	1.07	0.47	0.60	0.25	0.33	-0.08	0.49	0.24	0.25
	sd99	0.66	0.48	0.18	0.39	0.33	0.06	0.58	0.54	0.04	0.75	0.63	0.12	0.79	0.71	0.08	1.02	0.43	0.59	0.46	0.24	0.22

Table A.8 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	1.57	1.25	0.32	1.43	0.94	0.49	1.58	1.62	-0.04	2.61	1.44	1.17	0.94	1.28	-0.34	2.00	1.17	0.83	0.88	1.07	-0.19
	tx10	0.70	0.94	-0.24	0.81	0.83	-0.02	0.93	1.12	-0.19	1.15	1.34	-0.19	0.53	0.87	-0.34	0.41	0.67	-0.26	0.38	0.81	-0.43
	tx16	0.80	0.73	0.07	0.66	0.53	0.13	1.06	1.11	-0.05	1.34	1.22	0.12	0.63	0.53	0.10	0.40	0.41	-0.01	0.70	0.61	0.09
	tx21	0.74	0.74	0.00	0.59	0.53	0.06	1.32	1.24	0.08	0.93	1.26	-0.33	0.86	0.52	0.34	0.28	0.42	-0.14	0.47	0.47	0.00
	tx56	0.71	0.59	0.12	0.39	0.47	-0.08	1.08	1.27	-0.19	1.60	0.60	1.00	0.48	0.48	0.00	0.43	0.27	0.16	0.29	0.45	-0.16
	wa14	0.50	0.43	0.07	0.30	0.40	-0.10	0.63	0.38	0.25	0.69	0.63	0.06	0.37	0.26	0.11	0.35	0.33	0.02	0.69	0.58	0.11
	wa21	0.64	0.40	0.24	0.95	0.23	0.72	0.46	0.41	0.05	1.26	0.42	0.84	0.42	0.50	-0.08	0.37	0.42	-0.05	0.38	0.43	-0.05
	wy02	0.38	0.22	0.16	0.15	0.09	0.06	0.23	0.15	0.08	0.13	0.21	-0.08	1.37	0.59	0.78	0.27	0.18	0.09	0.12	0.10	0.02
	wy08	0.54	0.48	0.06	0.11	0.12	-0.01	0.13	0.23	-0.10	0.66	0.89	-0.23	1.50	0.99	0.51	0.55	0.51	0.04	0.26	0.16	0.10
	wy99	0.55	0.38	0.17	0.21	0.23	-0.02	0.22	0.36	-0.14	0.39	0.67	-0.28	1.36	0.59	0.77	0.52	0.30	0.22	0.62	0.15	0.47

Table A.9. Departures of observed 1995 bi-monthly and annual mean sodium ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	4.39	2.44	1.95	10.03	2.56	7.47	2.68	3.39	-0.71	3.32	2.26	1.06	2.36	2.05	0.31	4.00	2.33	1.67	3.94	2.05	1.89
	il18	2.04	2.56	-0.52	1.61	3.11	-1.50	2.77	2.95	-0.18	1.62	2.57	-0.95	1.77	2.00	-0.23	1.67	2.11	-0.44	2.78	2.61	0.17
	il63	3.84	3.11	0.73	2.97	3.26	-0.29	3.80	3.82	-0.02	5.06	2.85	2.21	3.73	2.36	1.37	3.03	2.72	0.31	4.45	3.64	0.81
	in20	3.65	1.84	1.81	2.50	2.54	-0.04	2.95	1.99	0.96	2.29	1.47	0.82	3.46	1.38	2.08	4.78	1.68	3.10	5.91	2.01	3.90
	in34	3.91	2.47	1.44	4.57	4.11	0.46	2.87	2.80	0.07	2.14	1.84	0.30	3.43	1.74	1.69	2.95	1.91	1.04	7.50	2.42	5.08
	in41	5.17	2.43	2.74	14.10	2.83	11.27	3.22	2.86	0.36	3.16	2.57	0.59	2.87	1.64	1.23	2.78	2.33	0.45	4.89	2.34	2.55
	ky03	2.86	2.41	0.45	1.32	2.50	-1.18	3.61	3.17	0.44	4.07	1.78	2.29	3.15	2.04	1.11	2.73	2.49	0.24	2.27	2.50	-0.23
	ky22	2.64	1.73	0.91	1.22	1.66	-0.44	2.78	2.07	0.71	3.39	1.71	1.68	3.82	1.58	2.24	2.62	1.58	1.04	2.02	1.79	0.23
	ky38	4.49	3.37	1.12	2.85	2.77	0.08	2.97	4.36	-1.39	7.83	3.55	4.28	3.96	2.97	0.99	4.43	3.04	1.39	4.88	3.52	1.36
	ma08	9.35	4.61	4.74	20.84	6.83	14.01	8.51	5.67	2.84	2.80	3.74	-0.94	2.37	2.44	-0.07	7.72	3.61	4.11	13.86	5.37	8.49
	ma13	19.03	11.83	7.20	34.42	17.43	16.99	18.96	13.33	5.63	7.30	6.32	0.98	4.65	5.43	-0.78	15.86	11.06	4.80	33.00	17.44	15.56
	md03	6.72	3.68	3.04	16.60	4.79	11.81	5.44	4.21	1.23	4.71	2.07	2.64	2.43	1.72	0.71	7.42	2.55	4.87	3.70	6.75	-3.05
	md13	10.06	8.33	1.73	8.65	7.64	1.01	13.88	10.37	3.51	8.05	5.57	2.48	5.99	5.27	0.72	12.07	7.70	4.37	11.69	13.42	-1.73
	me00	3.92	2.86	1.06	5.35	3.63	1.72	5.57	4.59	0.98	2.21	1.88	0.33	1.67	1.11	0.56	4.03	2.16	1.87	4.71	3.79	0.92
	me09	5.32	2.31	3.01	1.85	2.79	-0.94	4.16	2.80	1.36	1.76	1.77	-0.01	1.98	1.23	0.75	9.37	2.73	6.64	12.81	2.55	10.26
	mi09	2.15	1.64	0.51	2.33	2.20	0.13	2.14	1.64	0.50	3.21	1.49	1.72	1.41	1.40	0.01	1.76	1.32	0.44	2.08	1.82	0.26
	mi26	2.73	2.07	0.66	3.52	3.76	-0.24	2.20	2.37	-0.17	2.02	1.66	0.36	1.95	1.26	0.69	1.87	1.46	0.41	4.84	1.93	2.91
	mi53	2.64	2.21	0.43	4.25	3.93	0.32	2.42	2.27	0.15	3.21	1.66	1.55	1.33	1.59	-0.26	1.71	1.53	0.18	2.93	2.26	0.67
	mi98	2.14	1.54	0.60	2.97	2.08	0.89	1.61	1.89	-0.28	1.62	1.21	0.41	1.52	1.06	0.46	1.50	1.00	0.50	3.59	1.99	1.60
	mi99	2.40	1.68	0.72	3.60	2.77	0.83	2.00	1.84	0.16	1.06	1.18	-0.12	1.38	1.18	0.20	1.98	1.15	0.83	4.38	1.97	2.41
	nh02	4.89	2.69	2.20	7.44	2.70	4.74	4.58	3.50	1.08	1.59	2.20	-0.61	2.24	1.46	0.78	6.05	3.38	2.67	7.42	2.92	4.50
	nj99	8.51	7.51	1.00	6.94	9.24	-2.30	9.03	8.78	0.25	6.31	3.23	3.08	2.47	3.08	-0.61	13.52	8.21	5.31	12.81	12.53	0.28
	ny08	2.40	1.75	0.65	2.15	2.31	-0.16	4.55	2.06	2.49	1.99	1.48	0.51	2.07	1.17	0.90	1.75	1.56	0.19	1.91	1.90	0.01
	ny20	2.18	1.38	0.80	2.49	1.81	0.68	2.53	1.88	0.65	2.22	1.04	1.18	1.84	0.82	1.02	1.71	1.26	0.45	2.31	1.46	0.85
	ny52	5.52	2.13	3.39	16.28	3.54	12.74	5.18	2.41	2.77	2.79	1.30	1.49	2.63	1.28	1.35	2.31	1.55	0.76	3.93	2.66	1.27
	ny65	2.39	1.43	0.96	1.62	1.69	-0.07	3.95	1.70	2.25	1.53	1.27	0.26	2.45	1.05	1.40	1.95	1.36	0.59	2.86	1.49	1.37
	ny68	3.04	2.58	0.46	1.75	2.99	-1.24	3.49	3.81	-0.32	1.92	1.76	0.16	2.23	1.64	0.59	5.41	2.33	3.08	3.45	2.99	0.46
	ny98	1.83	1.29	0.54	1.92	1.60	0.32	1.66	1.51	0.15	2.17	1.05	1.12	1.94	0.80	1.14	1.67	1.19	0.48	1.63	1.59	0.04
	ny99	11.20	6.03	5.17	15.94	8.29	7.65	5.78	7.15	-1.37	7.28	2.86	4.42	2.34	3.07	-0.73	15.25	5.88	9.37	20.61	8.92	11.69
	oh17	3.39	2.45	0.94	3.14	3.16	-0.02	3.68	2.98	0.70	2.32	2.40	-0.08	1.79	1.46	0.33	3.15	2.14	1.01	6.23	2.54	3.69
	oh49	2.79	2.25	0.54	2.78	2.75	0.03	3.31	2.47	0.84	2.88	1.88	1.00	2.04	1.56	0.48	3.02	2.27	0.75	2.72	2.57	0.15
	oh71	3.20	2.33	0.87	3.06	2.62	0.44	4.91	3.06	1.85	2.44	1.94	0.50	2.10	1.84	0.26	3.11	2.20	0.91	3.60	2.35	1.25
	pa15	2.80	1.75	1.05	3.49	2.10	1.39	3.01	1.98	1.03	1.92	1.25	0.67	3.34	1.08	2.26	2.15	1.81	0.34	2.91	2.29	0.62
	pa29	2.25	1.77	0.48	3.12	1.98	1.14	2.77	2.20	0.57	1.54	1.41	0.13	2.25	1.21	1.04	1.94	1.83	0.11	1.91	1.98	-0.07
	pa42	2.43	1.89	0.54	2.10	2.18	-0.08	3.06	2.21	0.85	2.35	1.41	0.94	2.56	1.24	1.32	2.00	2.05	-0.05	2.53	2.23	0.30
	pa72	4.51	4.20	0.31	3.32	5.85	-2.53	5.44	5.65	-0.21	4.64	2.25	2.39	2.71	2.47	0.24	5.83	3.83	2.00	5.10	5.17	-0.07
	va00	7.67	4.51	3.16	16.61	5.32	11.29	6.59	5.47	1.12	3.93	2.43	1.50	7.27	2.12	5.15	5.69	3.18	2.51	5.93	8.54	-2.61
	va13	3.23	2.52	0.71	2.51	3.60	-1.09	4.54	3.05	1.49	4.25	1.86	2.39	3.42	1.99	1.43	2.64	1.98	0.66	2.05	2.64	-0.59
	va28	9.10	1.82	7.28	36.36	1.73	34.63	2.89	2.46	0.43	1.85	1.32	0.53	3.75	1.24	2.51	4.28	1.81	2.47	5.44	2.34	3.10
	vt01	3.31	3.11	0.20	4.97	5.36	-0.39	3.15	3.76	-0.61	2.18	1.97	0.21	2.03	1.42	0.61	3.10	2.40	0.70	4.45	3.75	0.70
	vt99	2.46	1.62	0.84	3.33	2.13	1.20	3.79	1.96	1.83	1.86	1.44	0.42	1.28	0.91	0.37	1.38	1.34	0.04	3.11	1.94	1.17
	wi28	3.24	1.96	1.28	6.17	3.25	2.92	1.89	2.10	-0.21	2.63	1.79	0.84	2.30	1.31	0.99	2.54	1.43	1.11	3.90	1.88	2.02
	wi36	1.84	1.34	0.50	3.39	1.59	1.80	1.37	1.64	-0.27	1.47	1.19	0.28	1.52	0.84	0.68	1.71	1.26	0.45	1.61	1.51	0.10
	wi37	2.52	1.70	0.82	4.62	1.93	2.69	2.51	1.66	0.85	1.68	1.58	0.10	1.81	1.04	0.77	2.49	1.51	0.98	2.03	2.47	-0.44
	wi99	2.10	1.95	0.15	2.69	2.70	-0.01	2.01	2.13	-0.12	2.48	1.42	1.06	1.67	1.79	-0.12	1.97	1.58	0.39	1.79	2.09	-0.30
	wv04	2.30	1.44	0.86	1.67	1.43	0.24	2.45	1.88	0.57	3.48	1.09	2.39	2.08	1.20	0.88	2.06	1.36	0.70	2.04	1.66	0.38
	wv18	2.37	1.69	0.68	2.25	1.84	0.41	2.39	2.01	0.38	3.34	1.50	1.84	1.50	1.39	0.11	1.55	1.58	-0.03	3.18	1.81	1.37

Table A.9 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	6.24	5.54	0.70	8.77	7.48	1.29	7.66	6.97	0.69	4.12	5.17	-1.05	5.57	3.61	1.96	4.01	3.79	0.22	7.33	6.23	1.10
	fl03	13.48	12.37	1.11	21.37	14.25	7.12	6.96	14.19	-7.23	12.95	7.52	5.43	8.90	6.11	2.79	20.38	9.75	10.63	10.30	22.37	-12.07
	fl11	28.06	31.31	-3.25	27.56	45.48	-17.92	45.81	37.40	8.41	17.71	15.24	2.47	14.78	20.09	-5.31	17.82	23.30	-5.48	44.67	46.36	-1.69
	fl41	17.50	15.46	2.04	30.29	22.37	7.92	10.84	17.60	-6.76	13.40	11.49	1.91	10.90	9.88	1.02	15.35	11.30	4.05	24.23	20.15	4.08
	ga41	6.84	4.67	2.17	7.95	5.66	2.29	8.08	5.40	2.68	4.39	5.51	-1.12	5.32	2.50	2.82	6.56	3.85	2.71	8.72	5.12	3.60
	ms10	8.16	5.63	2.53	13.96	4.84	9.12	8.91	9.04	-0.13	6.70	4.98	1.72	6.08	3.59	2.49	3.08	4.75	-1.67	10.21	6.55	3.66
	ms30	5.57	3.91	1.66	6.32	3.98	2.34	6.97	5.36	1.61	5.27	3.26	2.01	4.53	2.98	1.55	5.82	3.09	2.73	4.53	4.80	-0.27
	nc03	15.72	9.55	6.17	34.51	10.84	23.67	18.71	14.24	4.47	6.45	5.41	1.04	7.11	2.87	4.24	11.95	9.28	2.67	15.57	14.64	0.93
	nc25	3.38	3.76	-0.38	3.36	4.22	-0.86	5.23	5.46	-0.23	3.18	4.08	-0.90	3.03	1.79	1.24	3.21	2.38	0.83	2.25	4.59	-2.34
	nc34	5.63	5.86	-0.23	11.11	6.56	4.55	5.32	7.27	-1.95	3.91	4.94	-1.03	2.80	2.93	-0.13	5.93	6.09	-0.16	4.68	7.35	-2.67
	nc36	12.65	9.08	3.57	16.02	12.30	3.72	21.03	11.34	9.69	5.49	6.34	-0.85	4.61	3.12	1.49	11.17	9.19	1.98	17.56	12.16	5.40
	nc41	11.88	6.82	5.06	26.38	8.02	18.36	11.25	9.19	2.06	6.05	4.35	1.70	5.28	2.78	2.50	9.87	6.68	3.19	12.43	9.91	2.52
	sc06	10.33	10.53	-0.20	15.79	11.04	4.75	12.12	16.78	-4.66	7.07	8.43	-1.36	6.02	5.11	0.91	10.50	7.32	3.18	10.50	14.51	-4.01
	tn00	3.32	2.74	0.58	2.37	2.60	-0.23	3.69	3.78	-0.09	5.00	2.64	2.36	3.72	1.92	1.80	2.68	2.15	0.53	2.44	3.35	-0.91
	tn11	2.66	2.22	0.44	1.82	1.95	-0.13	2.77	2.66	0.11	3.31	2.89	0.42	1.93	1.65	0.28	2.58	2.18	0.40	3.57	1.97	1.60
West	ar02	5.60	6.45	-0.85	5.90	6.78	-0.88	4.57	8.33	-3.76	7.17	6.20	0.97	5.06	4.68	0.38	6.00	5.68	0.32	4.89	7.01	-2.12
	ar03	5.73	5.81	-0.08	5.32	5.80	-0.48	7.42	6.36	1.06	7.99	6.25	1.74	6.25	4.72	1.53	2.85	4.88	-2.03	4.54	6.87	-2.33
	ar27	3.72	3.46	0.26	1.96	2.68	-0.72	4.92	4.20	0.72	5.77	3.33	2.44	3.77	3.66	0.11	2.96	3.48	-0.52	2.93	3.38	-0.45
	az03	4.26	3.03	1.23	1.19	1.56	-0.37	2.12	3.19	-1.07	11.63	5.51	6.12	2.96	2.94	0.02	4.13	2.95	1.18	3.56	2.06	1.50
	co00	6.62	3.53	3.09	4.52	2.09	2.43	10.83	5.37	5.46	11.23	4.94	6.29	4.06	2.95	1.11	3.50	2.45	1.05	5.57	3.38	2.19
	co02	3.01	2.25	0.76	2.23	2.09	0.14	2.48	2.48	0.00	5.01	1.50	3.51	2.28	2.02	0.26	4.24	2.12	2.12	1.81	3.29	-1.48
	co15	2.81	2.04	0.77	1.81	1.39	0.42	3.60	2.74	0.86	3.12	2.57	0.55	3.23	2.39	0.84	2.83	1.50	1.33	2.29	1.64	0.65
	co19	2.10	1.68	0.42	1.58	1.36	0.22	2.82	1.61	1.21	1.50	2.12	-0.62	2.04	2.02	0.02	2.25	1.66	0.59	2.43	1.30	1.13
	co22	2.43	1.61	0.82	2.07	2.23	-0.16	3.06	1.52	1.54	1.84	1.68	0.16	2.77	1.15	1.62	1.91	1.39	0.52	2.94	1.69	1.25
	co97	1.96	2.06	-0.10	1.06	2.41	-1.35	2.75	2.28	0.47	2.12	2.45	-0.33	2.17	2.23	-0.06	2.17	1.50	0.67	1.46	1.52	-0.06
	co98	1.94	1.72	0.22	0.95	2.03	-1.08	1.49	1.93	-0.44	1.88	2.00	-0.12	2.80	1.69	1.11	2.48	1.29	1.19	2.03	1.37	0.66
	co99	3.26	2.46	0.80	1.19	1.79	-0.60	1.79	3.14	-1.35	6.01	3.50	2.51	3.18	1.90	1.28	2.79	2.47	0.32	4.62	1.99	2.63
	ia08	2.19	1.78	0.41	3.15	1.61	1.54	1.90	2.37	-0.47	1.63	2.16	-0.53	2.02	1.56	0.46	2.08	1.51	0.57	2.35	1.47	0.88
	ia23	3.29	2.00	1.29	1.96	1.08	0.88	2.62	2.74	-0.12	2.87	2.80	0.07	3.84	2.06	1.78	2.83	1.46	1.37	5.62	1.85	3.77
	id03	4.53	2.71	1.82	1.35	1.58	-0.23	2.64	4.08	-1.44	2.66	3.61	-0.95	7.04	2.76	4.28	7.17	2.69	4.48	6.31	1.57	4.74
	id11	6.75	6.14	0.61	1.20	3.40	-2.20	14.16	6.83	7.33	2.11	5.26	-3.15	7.82	6.08	1.74	11.97	5.56	6.41	3.22	9.73	-6.51
	ks31	2.68	2.30	0.38	2.46	1.69	0.77	2.84	2.32	0.52	3.10	2.72	0.38	2.39	2.38	0.01	2.11	2.23	-0.12	3.17	2.46	0.71
	ks32	2.99	1.96	1.03	1.18	1.58	-0.40	4.53	2.18	2.35	4.26	2.14	2.12	2.09	1.44	0.65	2.82	2.11	0.71	3.05	2.34	0.71
	la12	15.99	12.06	3.93	23.08	13.44	9.64	22.55	16.74	5.81	17.33	9.11	8.22	9.29	9.09	0.20	7.83	10.65	-2.82	15.83	13.31	2.52
	la30	11.88	9.50	2.38	16.23	13.34	2.89	13.88	13.24	0.64	9.67	6.69	2.98	7.53	5.33	2.20	12.14	6.97	5.17	11.81	11.41	0.40
	mn16	1.58	1.27	0.31	1.78	1.82	-0.04	1.74	1.39	0.35	1.15	1.10	0.05	1.61	0.96	0.65	1.52	0.96	0.56	1.69	1.38	0.31
	mn23	1.74	1.38	0.36	1.85	1.54	0.31	1.83	1.26	0.57	1.25	1.51	-0.26	1.74	0.93	0.81	2.04	1.14	0.90	1.74	1.90	-0.16
	mo03	3.28	2.82	0.46	1.68	3.41	-1.73	3.41	2.92	0.49	3.37	2.85	0.52	2.60	3.00	-0.40	3.52	2.28	1.24	5.10	2.45	2.65
	mt00	2.65	1.79	0.86	1.26	1.57	-0.31	3.19	1.56	1.63	2.30	2.19	0.11	3.18	2.30	0.88	3.70	1.65	2.05	2.30	1.48	0.82
	mt05	1.87	1.58	0.29	1.39	1.74	-0.35	2.36	1.62	0.74	1.52	1.67	-0.15	2.21	1.54	0.67	1.92	1.57	0.35	1.81	1.32	0.49
	nd08	1.94	1.78	0.16	2.33	1.30	1.03	1.68	2.96	-1.28	2.63	1.18	1.45	1.43	1.25	0.18	1.32	1.68	-0.36	2.22	2.33	-0.11
	nm07	2.52	1.54	0.98	0.96	1.10	-0.14	4.17	2.21	1.96	2.81	2.25	0.56	1.82	1.14	0.68	2.02	1.30	0.72	3.36	1.23	2.13
	nm08	4.88	2.24	2.64	4.48	2.57	1.91	4.54	4.46	0.08	4.53	2.13	2.40	2.26	1.30	0.96	1.53	1.11	0.42	11.91	1.84	10.07
	nm09	2.86	2.08	0.78	1.48	1.59	-0.11	2.84	2.38	0.46	3.74	3.34	0.40	2.65	1.71	0.94	3.40	1.76	1.64	3.06	1.67	1.39
	ok00	4.20	3.62	0.58	1.24	2.33	-1.09	4.00	4.20	-0.20	6.82	3.86	2.96	2.31	6.19	-3.88	9.03	3.35	5.68	1.79	1.80	-0.01
	ok17	4.12	3.71	0.41	3.29	1.66	1.63	6.48	4.89	1.59	6.43	4.96	1.47	4.62	4.44	0.18	2.02	2.71	-0.69	1.85	3.61	-1.76
	or09	2.21	1.84	0.37	1.40	1.49	-0.09	0.98	1.82	-0.84	2.13	2.04	0.09	4.21	1.69	2.52	3.13	2.83	0.30	1.40	1.17	0.23
	or10	5.92	5.21	0.71	1.64	6.00	-4.36	6.35	5.78	0.57	6.83	3.30	3.53	5.80	2.91	2.89	8.46	4.42	4.04	6.46	8.88	-2.42
	or18	1.81	1.69	0.12	1.03	1.43	-0.40	1.24	1.83	-0.59	1.49	1.99	-0.50	2.39	1.72	0.67	2.97	1.66	1.31	1.71	1.51	0.20
	or97	8.87	11.73	-2.86	3.22	16.00	-12.78	12.47	14.26	-1.79	6.36	6.21	0.15	6.62	3.64	2.98	6.99	10.36	-3.37	17.55	19.88	-2.33
	sd08	2.12	1.76	0.36	1.85	1.96	-0.11	2.42	2.45	-0.03	1.75	1.59	0.16	2.70	1.39	1.31	1.54	1.29	0.25	2.47	1.86	0.61
	sd99	2.24	2.08	0.16	2.57	3.14	-0.57	1.96	2.46	-0.50	1.40	1.78	-0.38	2.66	1.78	0.88	2.36	1.58	0.78	2.47	1.74	0.73

Table A.9 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	29.88	18.91	10.97	49.13	16.44	32.69	32.00	22.63	9.37	45.21	18.55	26.66	21.08	13.18	7.90	18.15	17.09	1.06	13.70	25.55	-11.85
	tx10	14.46	12.15	2.31	22.38	12.67	9.71	20.96	14.06	6.90	12.93	10.92	2.01	11.09	8.30	2.79	10.40	10.31	0.09	9.00	16.61	-7.61
	tx16	8.87	6.65	2.22	8.48	4.91	3.57	10.38	9.42	0.96	8.43	7.63	0.80	12.39	6.69	5.70	5.93	6.23	-0.30	7.60	5.05	2.55
	tx21	7.38	6.76	0.62	6.14	6.42	-0.28	7.57	8.82	-1.25	7.69	5.92	1.77	12.81	6.04	6.77	4.06	5.53	-1.47	6.03	7.84	-1.81
	tx56	4.62	4.07	0.55	3.47	3.28	0.19	6.65	6.83	-0.18	7.43	4.46	2.97	3.32	3.31	0.01	4.18	3.01	1.17	2.66	3.52	-0.86
	wa14	18.05	15.37	2.68	17.35	19.39	-2.04	26.03	13.95	12.08	15.14	15.51	-0.37	10.49	6.57	3.92	15.12	9.56	5.56	24.15	27.25	-3.10
	wa21	7.89	4.84	3.05	4.48	4.73	-0.25	4.73	5.37	-0.64	12.93	3.95	8.98	6.25	2.68	3.57	7.71	4.50	3.21	11.21	7.82	3.39
	wy02	3.77	1.47	2.30	5.42	0.85	4.57	3.31	1.79	1.52	1.68	1.21	0.47	3.34	2.42	0.92	7.50	1.25	6.25	1.39	1.30	0.09
	wy08	1.79	2.45	-0.66	1.20	1.96	-0.76	1.46	2.56	-1.10	2.37	3.76	-1.39	2.85	2.82	0.03	1.73	2.21	-0.48	1.14	1.40	-0.26
	wy99	2.99	1.44	1.55	2.93	1.92	1.01	2.17	1.70	0.47	1.79	1.52	0.27	3.94	1.19	2.75	2.15	1.07	1.08	4.97	1.24	3.73

Table A.10. Departures of observed 1995 bi-monthly and annual mean chloride ion concentrations (μeq/L) from values estimated from seasonalized trend models using NADP/NTN data from 1983 through 1994.

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
NE	il11	4.63	3.46	1.17	10.52	3.68	6.84	3.01	4.22	-1.21	3.25	3.49	-0.24	3.41	3.31	0.10	4.19	3.19	1.00	3.39	2.86	0.53
	il18	2.18	3.22	-1.04	1.75	3.63	-1.88	2.90	3.77	-0.87	2.48	3.24	-0.76	1.81	2.76	-0.95	1.77	2.68	-0.91	2.34	3.24	-0.90
	il63	3.92	4.85	-0.93	3.46	5.04	-1.58	3.86	5.49	-1.63	4.98	4.66	0.32	3.76	3.70	0.06	2.85	4.32	-1.47	4.58	5.89	-1.31
	in20	4.32	2.89	1.43	3.11	3.52	-0.41	2.92	3.07	-0.15	3.11	2.57	0.54	5.42	2.53	2.89	4.57	2.65	1.92	6.80	3.02	3.78
	in34	5.36	4.44	0.92	6.90	6.43	0.47	3.29	4.76	-1.47	3.73	3.91	-0.18	4.98	3.92	1.06	4.84	3.15	1.69	8.41	4.47	3.94
	in41	5.17	3.19	1.98	13.96	3.69	10.27	3.74	3.35	0.39	3.52	3.69	-0.17	3.56	2.47	1.09	2.51	3.10	-0.59	3.73	2.84	0.89
	ky03	3.30	3.38	-0.08	1.66	3.05	-1.39	3.49	3.92	-0.43	3.72	3.31	0.41	3.44	3.50	-0.06	5.11	3.10	2.01	2.36	3.38	-1.02
	ky22	2.79	2.12	0.67	1.52	1.87	-0.35	3.07	2.82	0.25	3.43	2.37	1.06	4.03	1.94	2.09	2.47	1.77	0.70	2.19	1.97	0.22
	ky38	4.37	4.23	0.14	3.24	3.95	-0.71	3.08	5.15	-2.07	6.96	4.60	2.36	3.01	3.66	-0.65	4.44	3.65	0.79	5.46	4.37	1.09
	ma08	10.00	5.82	4.18	20.23	7.53	12.70	9.24	7.89	1.35	3.26	4.88	-1.62	3.71	4.10	-0.39	8.28	4.63	3.65	15.26	5.92	9.34
	ma13	22.14	13.24	8.90	41.32	18.37	22.95	22.37	14.40	7.97	8.76	8.08	0.68	5.44	7.37	-1.93	17.09	12.70	4.39	37.84	18.48	19.36
	md03	7.40	6.07	1.33	14.94	7.96	6.98	6.84	6.36	0.48	6.91	4.33	2.58	2.36	4.10	-1.74	9.07	3.84	5.23	4.28	9.80	-5.52
	md13	12.36	10.61	1.75	9.96	9.41	0.55	18.39	12.24	6.15	10.07	7.52	2.55	8.91	7.56	1.35	13.68	10.86	2.82	13.15	16.08	-2.93
	me00	3.85	3.39	0.46	5.54	4.50	1.04	5.74	5.25	0.49	2.02	2.31	-0.29	1.46	1.66	-0.20	3.47	2.42	1.05	4.87	4.18	0.69
	me09	5.66	2.68	2.98	1.96	3.22	-1.26	4.27	3.30	0.97	1.46	2.26	-0.80	1.63	1.65	-0.02	10.25	2.85	7.40	14.39	2.81	11.58
	mi09	2.49	2.30	0.19	3.21	3.34	-0.13	2.32	2.21	0.11	3.18	2.24	0.94	1.83	2.00	-0.17	1.69	1.63	0.06	2.71	2.38	0.33
	mi26	3.73	3.24	0.49	5.71	5.32	0.39	2.90	3.20	-0.30	3.07	2.78	0.29	4.10	2.45	1.65	2.07	2.45	-0.38	4.53	3.26	1.27
	mi53	3.09	3.11	-0.02	5.56	5.46	0.10	2.65	2.85	-0.20	3.19	2.40	0.79	2.02	2.43	-0.41	1.88	1.99	-0.11	3.22	3.51	-0.29
	mi98	2.10	2.18	-0.08	3.12	2.83	0.29	1.74	2.45	-0.71	1.82	1.88	-0.06	1.62	1.92	-0.30	1.41	1.50	-0.09	2.87	2.48	0.39
	mi99	2.25	1.90	0.35	3.68	2.88	0.80	1.48	2.01	-0.53	1.29	1.47	-0.18	1.66	1.51	0.15	1.66	1.45	0.21	3.76	2.09	1.67
	nh02	5.28	3.39	1.89	8.78	3.42	5.36	4.88	4.17	0.71	1.89	3.03	-1.14	2.07	2.33	-0.26	6.14	3.82	2.32	7.89	3.59	4.30
	nj99	9.85	9.56	0.29	8.89	11.32	-2.43	10.08	10.89	-0.81	7.25	5.05	2.20	4.05	5.00	-0.95	14.70	9.98	4.72	14.13	15.10	-0.97
	ny08	3.43	3.29	0.14	3.58	4.02	-0.44	5.97	3.39	2.58	3.08	3.17	-0.09	3.45	3.20	0.25	2.14	2.90	-0.76	2.33	3.07	-0.74
	ny20	2.42	1.93	0.49	3.50	2.25	1.25	2.53	2.39	0.14	2.10	1.82	0.28	2.18	1.69	0.49	1.70	1.71	-0.01	2.48	1.73	0.75
	ny52	6.83	3.41	3.42	20.08	5.86	14.22	5.79	3.50	2.29	2.81	2.63	0.18	4.82	2.54	2.28	2.75	2.36	0.39	4.73	3.60	1.13
	ny65	2.79	2.69	0.10	1.71	2.36	-0.65	3.93	3.02	0.91	2.35	2.84	-0.49	4.21	2.82	1.39	2.08	2.67	-0.59	2.49	2.41	0.08
	ny68	3.91	3.77	0.14	2.24	4.36	-2.12	6.21	4.81	1.40	2.35	3.07	-0.72	2.83	3.01	-0.18	5.36	3.41	1.95	4.45	3.94	0.51
	ny98	1.97	1.73	0.24	2.21	1.92	0.29	1.99	1.93	0.06	2.25	1.78	0.47	1.76	1.58	0.18	1.52	1.46	0.06	2.06	1.72	0.34
	ny99	14.98	11.64	3.34	20.15	14.91	5.24	8.43	13.31	-4.88	14.28	7.12	7.16	4.23	6.83	-2.60	17.74	11.11	6.63	25.06	16.56	8.50
	oh17	4.06	3.91	0.15	3.74	5.07	-1.33	4.60	4.44	0.16	3.22	3.90	-0.68	2.89	3.09	-0.20	3.08	3.34	-0.26	6.85	3.60	3.25
	oh49	4.40	4.65	-0.25	4.66	5.95	-1.29	4.57	4.81	-0.24	4.50	4.46	0.04	3.60	3.42	0.18	4.11	4.37	-0.26	4.96	4.91	0.05
	oh71	4.17	3.75	0.42	3.72	4.51	-0.79	5.66	4.47	1.19	3.66	3.66	0.00	3.24	3.34	-0.10	3.46	3.06	0.40	5.26	3.44	1.82
	pa15	4.18	3.76	0.42	4.74	4.41	0.33	5.71	3.74	1.97	3.79	3.51	0.28	5.34	3.48	1.86	2.22	3.59	-1.37	3.30	3.83	-0.53
	pa29	3.71	3.58	0.13	5.36	4.33	1.03	4.10	3.77	0.33	2.41	3.25	-0.84	4.26	3.06	1.20	2.95	3.24	-0.29	3.19	3.80	-0.61
	pa42	3.75	4.23	-0.48	3.05	4.60	-1.55	4.98	4.25	0.73	3.83	3.85	-0.02	4.71	4.11	0.60	2.30	4.07	-1.77	3.64	4.47	-0.83
	pa72	5.21	5.24	-0.03	3.75	6.75	-3.00	5.60	6.30	-0.70	5.73	3.69	2.04	4.22	3.74	0.48	5.87	4.45	1.42	6.11	6.53	-0.42
	va00	8.90	5.64	3.26	19.95	7.05	12.90	7.73	6.11	1.62	4.83	3.68	1.15	9.01	3.39	5.62	5.42	3.84	1.58	6.47	9.80	-3.33
	va13	3.48	3.07	0.41	3.31	3.20	0.11	4.67	3.43	1.24	4.03	3.00	1.03	3.32	2.78	0.54	2.99	2.87	0.12	2.55	3.17	-0.62
	va28	7.90	2.44	5.46	29.58	2.22	27.36	3.19	3.10	0.09	1.82	1.98	-0.16	3.80	2.23	1.57	4.05	2.48	1.57	4.97	2.63	2.34
	vt01	3.47	3.81	-0.34	5.19	5.61	-0.42	3.75	4.35	-0.60	2.31	3.12	-0.81	1.83	2.70	-0.87	3.04	3.44	-0.40	4.72	3.63	1.09
	vt99	2.58	2.16	0.42	4.20	2.91	1.29	3.38	2.37	1.01	1.74	2.19	-0.45	1.44	1.60	-0.16	1.37	1.83	-0.46	3.34	2.04	1.30
	wi28	2.92	2.27	0.65	4.85	3.49	1.36	1.85	2.44	-0.59	2.34	2.23	0.11	2.49	1.77	0.72	2.08	1.54	0.54	3.93	2.14	1.79
	wi36	1.68	1.64	0.04	2.89	1.93	0.96	1.51	1.86	-0.35	1.49	1.66	-0.17	1.36	1.53	-0.17	1.39	1.33	0.06	1.43	1.50	-0.07
	wi37	2.19	1.85	0.34	3.42	2.23	1.19	2.38	1.74	0.64	1.59	1.98	-0.39	1.79	1.59	0.20	2.62	1.48	1.14	1.34	2.08	-0.74
	wi99	2.49	2.78	-0.29	3.02	3.85	-0.83	2.32	2.88	-0.56	2.74	2.48	0.26	2.58	2.47	0.11	2.22	2.16	0.06	2.08	2.84	-0.76
	wv04	2.93	2.44	0.49	2.80	2.73	0.07	3.25	3.09	0.16	3.31	2.20	1.11	2.54	2.06	0.48	2.54	2.05	0.49	3.12	2.52	0.60
	wv18	3.24	3.07	0.17	4.08	3.27	0.81	3.40	3.44	-0.04	3.83	3.24	0.59	2.77	3.04	-0.27	1.68	2.51	-0.83	3.71	2.91	0.80

Table A.10 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
SE	al10	6.48	6.44	0.04	9.61	8.61	1.00	8.10	7.88	0.22	4.24	6.17	-1.93	5.56	4.34	1.22	3.61	4.23	-0.62	7.76	7.39	0.37
	fl03	14.74	13.33	1.41	24.43	15.76	8.67	7.18	15.65	-8.47	15.24	8.06	7.18	8.32	7.66	0.66	22.64	11.26	11.38	10.63	21.58	-10.95
	fl11	30.30	37.17	-6.87	31.51	54.05	-22.54	48.71	45.59	3.12	18.99	18.85	0.14	16.17	23.02	-6.85	19.03	26.94	-7.91	47.36	54.56	-7.20
	fl41	17.98	17.43	0.55	25.78	25.21	0.57	12.23	19.89	-7.66	14.85	12.82	2.03	12.32	11.50	0.82	16.95	12.84	4.11	25.75	22.31	3.44
	ga41	7.32	5.36	1.96	8.35	6.10	2.25	8.87	6.07	2.80	4.56	6.32	-1.76	5.71	3.29	2.42	6.33	4.46	1.87	10.09	5.89	4.20
	ms10	8.53	6.31	2.22	15.34	5.68	9.66	9.38	9.81	-0.43	7.28	5.62	1.66	5.87	4.20	1.67	2.89	5.27	-2.38	10.41	7.31	3.10
	ms30	5.77	5.39	0.38	6.83	6.59	0.24	7.39	7.03	0.36	6.67	4.28	2.39	4.11	3.76	0.35	5.42	4.03	1.39	4.20	6.65	-2.45
	nc03	16.06	11.23	4.83	31.26	12.85	18.41	22.48	16.47	6.01	6.56	6.47	0.09	6.88	3.94	2.94	12.87	10.66	2.21	16.33	16.99	-0.66
	nc25	3.52	4.23	-0.71	3.77	4.62	-0.85	4.95	5.99	-1.04	3.57	4.33	-0.76	3.34	2.59	0.75	3.29	2.77	0.52	2.21	5.07	-2.86
	nc34	6.51	6.64	-0.13	13.43	7.49	5.94	6.19	7.95	-1.76	4.65	5.67	-1.02	3.27	4.35	-1.08	6.01	6.23	-0.22	5.51	8.16	-2.65
	nc36	14.41	10.35	4.06	18.76	13.83	4.93	25.52	12.90	12.62	5.67	7.47	-1.80	4.75	3.98	0.77	11.63	10.14	1.49	20.12	13.76	6.36
	nc41	12.53	7.72	4.81	26.34	9.08	17.26	12.64	10.15	2.49	6.60	5.11	1.49	5.95	3.64	2.31	10.19	7.40	2.79	13.47	10.96	2.51
	sc06	11.34	12.58	-1.24	17.67	12.51	5.16	13.71	18.89	-5.18	7.60	9.95	-2.35	7.43	6.48	0.95	11.04	10.93	0.11	10.61	16.70	-6.09
	tn00	4.48	4.32	0.16	4.01	4.47	-0.46	4.59	4.97	-0.38	5.69	4.64	1.05	4.66	3.66	1.00	4.54	3.20	1.34	3.42	4.96	-1.54
	tn11	2.75	2.66	0.09	2.43	2.30	0.13	2.95	2.94	0.01	3.37	3.24	0.13	2.21	2.34	-0.13	1.90	2.73	-0.83	3.64	2.44	1.20
West	ar02	5.76	6.68	-0.92	6.00	6.75	-0.75	5.56	8.25	-2.69	7.15	6.99	0.16	5.16	5.16	0.00	5.78	5.56	0.22	4.91	7.36	-2.45
	ar03	5.52	6.04	-0.52	4.86	6.28	-1.42	6.90	6.49	0.41	7.64	6.59	1.05	6.36	4.59	1.77	3.21	4.85	-1.64	4.12	7.44	-3.32
	ar27	3.28	3.85	-0.57	1.71	3.42	-1.71	4.65	4.14	0.51	5.36	3.83	1.53	3.11	4.10	-0.99	2.77	3.82	-1.05	2.05	3.78	-1.73
	az03	4.28	3.06	1.22	1.25	1.50	-0.25	1.77	3.09	-1.32	13.34	5.57	7.77	2.91	3.48	-0.57	3.53	2.93	0.60	2.90	1.81	1.09
	co00	2.29	1.87	0.42	1.56	1.55	0.01	2.05	1.91	0.14	3.72	2.37	1.35	2.61	2.45	0.16	2.64	1.54	1.10	1.13	1.43	-0.30
	co02	2.54	2.11	0.43	1.81	1.53	0.28	1.56	2.12	-0.56	4.10	1.58	2.52	2.50	2.75	-0.25	3.60	2.09	1.51	1.69	2.57	-0.88
	co15	3.10	2.16	0.94	1.21	1.74	-0.53	7.59	2.06	5.53	2.51	2.67	-0.16	2.98	2.94	0.04	2.59	1.76	0.83	1.71	1.76	-0.05
	co19	2.08	2.31	-0.23	1.61	1.33	0.28	1.95	1.81	0.14	1.56	3.24	-1.68	2.83	3.34	-0.51	2.74	2.70	0.04	1.76	1.41	0.35
	co22	2.21	1.91	0.30	2.61	2.25	0.36	1.93	1.76	0.17	1.73	2.10	-0.37	3.11	2.13	0.98	2.00	1.72	0.28	1.86	1.49	0.37
	co97	1.80	2.01	-0.21	1.92	1.77	0.15	1.68	2.08	-0.40	1.69	2.40	-0.71	2.28	2.65	-0.37	2.00	1.61	0.39	1.22	1.55	-0.33
	co98	1.55	1.66	-0.11	1.04	1.36	-0.32	1.12	1.44	-0.32	1.52	2.36	-0.84	2.37	2.21	0.16	2.17	1.45	0.72	1.08	1.15	-0.07
	co99	2.73	2.35	0.38	1.24	1.47	-0.23	1.35	2.48	-1.13	5.63	3.50	2.13	2.73	2.32	0.41	2.37	2.57	-0.20	3.09	1.77	1.32
	ia08	2.41	2.44	-0.03	2.66	2.63	0.03	2.12	2.90	-0.78	2.23	2.62	-0.39	2.68	2.15	0.53	2.25	2.06	0.19	2.53	2.30	0.23
	ia23	2.81	2.57	0.24	2.54	1.80	0.74	2.65	3.17	-0.52	2.20	3.52	-1.32	3.43	2.79	0.64	2.46	2.12	0.34	3.59	2.02	1.57
	id03	4.10	3.05	1.05	2.55	1.94	0.61	1.86	3.08	-1.22	3.05	3.48	-0.43	6.81	4.84	1.97	7.53	3.04	4.49	2.80	1.92	0.88
	id11	3.20	3.14	0.06	1.26	2.25	-0.99	6.90	2.38	4.52	1.58	3.09	-1.51	4.63	5.12	-0.49	3.44	2.92	0.52	1.38	3.07	-1.69
	ks31	2.43	2.79	-0.36	2.17	2.28	-0.11	2.43	2.38	0.05	2.52	3.48	-0.96	2.48	3.16	-0.68	1.93	2.83	-0.90	3.07	2.58	0.49
	ks32	2.60	2.16	0.44	0.97	1.84	-0.87	3.15	1.87	1.28	3.14	2.46	0.68	4.12	2.56	1.56	2.27	2.20	0.07	1.97	2.01	-0.04
	la12	18.33	14.77	3.56	26.32	15.59	10.73	25.70	19.68	6.02	21.53	12.46	9.07	10.59	12.28	-1.69	8.88	13.12	-4.24	16.98	15.51	1.47
	la30	12.93	10.42	2.51	17.94	14.71	3.23	16.09	14.53	1.56	10.84	7.65	3.19	8.00	5.66	2.34	12.75	7.66	5.09	11.98	12.32	-0.34
	mn16	1.41	1.42	-0.01	1.83	1.82	0.01	1.52	1.40	0.12	1.09	1.40	-0.31	1.43	1.35	0.08	1.11	1.00	0.11	1.48	1.54	-0.06
	mn23	1.62	1.79	-0.17	1.81	1.86	-0.05	1.88	1.57	0.31	1.35	1.89	-0.54	1.82	1.57	0.25	1.32	1.41	-0.09	1.54	2.46	-0.92
	mo03	3.03	3.00	0.03	1.84	3.47	-1.63	3.34	3.03	0.31	2.96	3.23	-0.27	2.43	3.21	-0.78	3.23	2.63	0.60	4.36	2.43	1.93
	mt00	2.01	1.65	0.36	1.28	1.48	-0.20	2.58	1.35	1.23	1.62	1.73	-0.11	3.27	2.62	0.65	1.63	1.48	0.15	1.65	1.26	0.39
	mt05	1.24	1.20	0.04	1.08	1.23	-0.15	1.37	1.09	0.28	1.09	1.21	-0.12	1.61	1.32	0.29	1.18	1.19	-0.01	1.10	1.15	-0.05
	nd08	1.67	1.90	-0.23	2.29	1.88	0.41	1.42	2.08	-0.66	2.55	1.47	1.08	1.17	1.61	-0.44	1.20	1.77	-0.57	1.39	2.58	-1.19
	nm07	2.30	1.62	0.68	1.02	1.19	-0.17	3.04	1.97	1.07	2.82	2.29	0.53	2.10	1.63	0.47	2.03	1.45	0.58	2.79	1.22	1.57
	nm08	4.20	2.25	1.95	4.19	1.93	2.26	3.66	3.88	-0.22	3.78	2.42	1.36	2.21	1.71	0.50	1.41	1.44	-0.03	9.94	2.13	7.81
	nm09	2.55	2.05	0.50	1.43	1.28	0.15	2.24	2.06	0.18	3.69	3.52	0.17	2.97	2.14	0.83	2.82	1.88	0.94	2.16	1.42	0.74
	ok00	3.86	3.72	0.14	1.30	2.11	-0.81	3.37	3.96	-0.59	5.71	4.35	1.36	2.36	6.42	-4.06	8.05	3.63	4.42	2.37	1.82	0.55
	ok17	3.51	3.38	0.13	2.45	2.09	0.36	5.07	3.69	1.38	6.11	4.04	2.07	3.80	4.40	-0.60	2.09	3.00	-0.91	1.52	3.08	-1.56
	or09	1.68	1.60	0.08	1.32	1.45	-0.13	1.11	1.62	-0.51	1.12	1.59	-0.47	3.10	1.78	1.32	2.40	2.05	0.35	1.05	1.09	-0.04
	or10	6.39	5.59	0.80	1.61	6.47	-4.86	6.98	6.28	0.70	7.45	3.31	4.14	6.72	2.89	3.83	8.88	4.78	4.10	6.71	9.81	-3.10
	or18	1.41	1.46	-0.05	1.16	1.21	-0.05	1.02	1.48	-0.46	1.25	1.50	-0.25	1.75	1.75	0.00	2.13	1.40	0.73	1.13	1.45	-0.32
	or97	9.70	13.35	-3.65	3.44	18.08	-14.64	14.16	16.67	-2.51	6.84	6.56	0.28	7.09	4.38	2.71	7.17	11.79	-4.62	19.51	22.61	-3.10
	sd08	1.76	1.61	0.15	1.69	1.35	0.34	1.57	1.99	-0.42	1.63	1.69	-0.06	2.61	1.69	0.92	1.22	1.49	-0.27	1.84	1.44	0.40
	sd99	1.97	1.98	-0.01	2.35	2.59	-0.24	1.63	2.21	-0.58	1.46	1.90	-0.44	2.70	2.00	0.70	2.08	1.46	0.62	1.60	1.70	-0.10

Table A.10 (continued).

Region	Site	Annual Mean			January-February			March-April			May-June			July-August			September-October			November-December		
		Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.	Obs.	Est.	Diff.
	tx03	32.50	20.92	11.58	51.05	17.94	33.11	36.07	23.84	12.23	51.70	20.15	31.55	21.86	17.13	4.73	19.40	18.86	0.54	14.93	27.63	-12.70
	tx10	15.67	14.05	1.62	24.34	14.09	10.25	22.77	15.14	7.63	14.74	12.47	2.27	12.32	9.53	2.79	11.21	12.95	-1.74	8.62	20.09	-11.47
	tx16	8.38	6.71	1.67	8.76	5.18	3.58	9.46	8.91	0.55	7.07	7.26	-0.19	11.71	7.45	4.26	5.36	6.67	-1.31	7.93	4.79	3.14
	tx21	7.75	7.28	0.47	6.44	7.12	-0.68	7.95	8.99	-1.04	7.78	6.59	1.19	14.06	6.55	7.51	3.75	5.83	-2.08	6.53	8.61	-2.08
	tx56	4.33	4.57	-0.24	2.80	3.68	-0.88	5.96	7.26	-1.30	7.60	4.98	2.62	3.34	3.80	-0.46	4.15	3.72	0.43	2.15	4.00	-1.85
	wa14	20.14	16.84	3.30	17.20	23.51	-6.31	31.17	16.83	14.34	17.83	15.93	1.90	11.32	6.34	4.98	16.30	10.00	6.30	27.01	28.43	-1.42
	wa21	8.14	5.28	2.86	5.19	5.49	-0.30	4.97	5.81	-0.84	11.78	4.00	7.78	6.86	2.58	4.28	7.82	5.11	2.71	12.21	8.70	3.51
	wy02	1.63	1.32	0.31	1.69	0.98	0.71	1.29	0.99	0.30	1.37	1.07	0.30	2.97	2.91	0.06	1.48	1.05	0.43	0.95	0.91	0.04
	wy08	1.95	2.14	-0.19	1.41	1.62	-0.21	1.26	1.81	-0.55	2.27	2.80	-0.53	3.42	2.85	0.57	2.23	2.07	0.16	1.08	1.70	-0.62
	wy99	2.32	1.58	0.74	1.82	1.54	0.28	1.43	1.46	-0.03	1.63	1.79	-0.16	3.46	2.12	1.34	1.80	1.39	0.41	3.80	1.19	2.61

Table A.11. Changes in the intercept of the deseasonalized trend model during 1995 relative to the 1983-94 trend period. Significance values, p, are those for a binary, 1983-94 vs. 1995, indicator variable added to the trend model.

		Hydrogen Ion		Sulfate		Nitrate		Chloride	
		1995		1995		1995		1995	
Region	Site	Effect	p	Effect	p	Effect	p	Effect	p
NE	il11	-	0.0200	-	0.2323	+	0.3326	+	0.9144
	il18	-	0.2866	-	0.1940	-	0.2982	-	0.0067
	il63	-	0.0003	-	0.0010	-	0.6054	-	0.0953
	in20	-	0.4259	+	0.1272	+	0.0628	+	0.0250
	in34	-	0.1136	+	0.8516	+	0.2549	+	0.3677
	in41	-	0.7193	+	0.4504	+	0.0274	+	0.0784
	ky03	-	0.0017	-	0.0010	-	0.5825	-	0.6444
	ky22	-	0.7927	-	0.9900	+	0.1171	+	0.1686
	ky38	-	0.2503	-	0.1893	+	0.8395	-	0.9362
	ma08	-	0.3801	-	0.5688	+	0.8688	+	0.0800
	ma13	+	0.6525	-	0.0850	-	0.7829	+	0.1436
	md03	-	0.0002	-	0.0008	-	0.0618	+	0.6231
	md13	-	0.1306	-	0.1016	-	0.7238	+	0.4132
	me00	-	0.3113	-	0.0154	-	0.4037	+	0.6212
	me09	-	0.0917	-	0.0957	-	0.2542	+	0.1161
	mi09	-	0.7117	+	0.5359	+	0.1491	+	0.5615
	mi26	+	0.9873	+	0.0415	+	0.0106	+	0.2743
	mi53	-	0.1856	-	0.2268	-	0.9148	-	0.8971
	mi98	-	0.4045	-	0.3243	-	0.4943	-	0.5777
	mi99	-	0.1670	-	0.3041	-	0.9596	+	0.4423
	nh02	-	0.5545	-	0.2005	+	0.9459	+	0.1445
	nj99	-	0.3784	-	0.0494	+	0.8394	+	0.8827
	ny08	-	0.1253	-	0.1222	-	0.9844	-	0.9231
	ny20	-	0.1758	-	0.3518	+	0.8060	+	0.1629
	ny52	-	0.1431	-	0.4144	+	0.2198	+	0.0002
	ny65	-	0.0098	-	0.0266	-	0.4819	-	0.9486
	ny68	-	0.1027	-	0.1134	-	0.3545	-	0.8890
	ny98	-	0.7032	-	0.4226	+	0.3298	+	0.3288
	ny99	-	0.0588	-	0.1524	-	0.9702	+	0.4999
	oh17	-	0.0343	-	0.0076	-	0.9731	+	0.9695
	oh49	-	0.0184	-	0.0289	-	0.4724	-	0.7257
	oh71	-	0.0466	-	0.0587	-	0.6990	+	0.4755
	pa15	-	0.1210	-	0.1322	+	0.8472	+	0.5899
	pa29	-	0.3003	-	0.1929	+	0.3333	+	0.9345
	pa42	-	0.1412	-	0.1453	+	0.8159	-	0.2374
	pa72	-	0.2627	-	0.1723	+	0.9975	+	0.9663
	va00	-	0.2323	-	0.1570	+	0.9543	+	0.0640
	va13	-	0.1929	-	0.1647	-	0.8896	+	0.4601
	va28	-	0.0184	-	0.0311	-	0.3142	+	0.0296
	vt01	-	0.1435	-	0.1453	-	0.7265	-	0.3612
	vt99	-	0.0225	-	0.0088	-	0.2614	+	0.4095
	wi28	+	0.3113	+	0.1484	+	0.2562	+	0.0855
	wi36	-	0.8748	-	0.4744	-	0.8068	-	0.9823
	wi37	-	0.7761	-	0.5215	-	0.1628	+	0.3206
	wi99	-	0.0721	-	0.2700	-	0.6757	-	0.4804
	wv04	-	0.3478	-	0.3738	+	0.3615	+	0.1114
	wv18	-	0.0078	-	0.0039	+	0.8802	+	0.8409
SE	al10	-	0.4776	-	0.7191	+	0.6665	-	0.9193
	fl03	-	0.0180	-	0.1186	-	0.4534	+	0.7751
	fl11	+	0.1570	+	0.2658	+	0.4648	-	0.1779
	fl41	-	0.6361	-	0.3756	-	0.2340	+	0.8814
	ga41	-	0.2045	-	0.9672	+	0.2139	+	0.0791
	ms10	+	0.7975	+	0.2125	+	0.1817	+	0.2284
	ms30	-	0.9865	+	0.4249	+	0.2129	+	0.6853

Table A.11 (continued).

Region	Site	Hydrogen Ion 1995 Effect	Hydrogen Ion p	Sulfate 1995 Effect	Sulfate p	Nitrate 1995 Effect	Nitrate p	Chloride 1995 Effect	Chloride p
	nc03	–	0.5510	–	0.5619	+	0.8496	+	0.1332
	nc25	–	0.6623	–	0.8155	+	0.5079	–	0.4390
	nc34	–	0.3029	–	0.2694	+	0.7835	–	0.6229
	nc36	–	0.1039	–	0.0668	–	0.3279	+	0.2894
	nc41	–	0.2779	–	0.1930	–	0.9793	+	0.0419
	sc06	–	0.1093	–	0.4418	–	0.6005	–	0.6956
	tn00	–	0.6080	+	0.4500	+	0.3886	+	0.8081
	tn11	–	0.0535	–	0.0503	–	0.9207	+	0.9162
West	ar02	–	0.9935	–	0.4060	+	0.8393	–	0.3492
	ar03	+	0.6324	+	0.1509	+	0.0957	–	0.5090
	ar27	+	0.3280	+	0.3039	+	0.4041	–	0.1749
	az03	–	0.9869	+	0.8581	–	0.7252	+	0.7153
	co00	+	0.8820	+	0.1571	+	0.2311	+	0.5107
	co02	–	0.3230	+	0.4486	–	0.9821	+	0.5367
	co15	–	0.1915	–	0.2508	–	0.0626	+	0.2577
	co19	+	0.1518	+	0.1782	–	0.6031	–	0.7781
	co22	+	0.1723	+	0.0853	+	0.1757	+	0.5588
	co97	–	0.6517	–	0.1603	–	0.2674	–	0.4768
	co98	+	0.5578	+	0.7284	–	0.5266	–	0.5083
	co99	+	0.7369	+	0.6266	–	0.9466	+	0.7888
	ia08	–	0.0157	–	0.3152	–	0.5311	–	0.9584
	ia23	–	0.2045	+	0.6705	+	0.5952	+	0.4547
	id03	+	0.9229	+	0.4151	+	0.9098	+	0.4167
	id11	+	0.7390	–	0.1078	–	0.0142	–	0.5811
	ks31	+	0.7944	–	0.6287	+	0.5695	–	0.4536
	ks32	–	0.3002	–	0.8520	–	0.5427	+	0.3926
	la12	–	0.7179	+	0.4267	+	0.2958	+	0.4121
	la30	–	0.7347	+	0.3104	+	0.2053	+	0.1923
	mn16	+	0.3880	–	0.6334	–	0.8926	–	0.9543
	mn23	+	0.7511	–	0.6184	–	0.7736	–	0.5173
	mo03	–	0.5250	–	0.8159	+	0.5717	–	0.7606
	mt00	–	0.9061	–	0.5565	–	0.3750	+	0.3919
	mt05	–	0.6248	–	0.0901	–	0.1991	+	0.8518
	nd08	–	0.7759	+	0.8036	–	0.9061	–	0.3800
	nm07	–	0.7822	–	0.7397	+	0.1398	+	0.0596
	nm08	–	0.0068	+	0.2102	+	0.0369	+	0.0778
	nm09	+	0.0383	+	0.0853	+	0.0639	+	0.1266
	ok00	+	0.5862	–	0.9297	+	0.8269	–	0.8502
	ok17	+	0.5670	+	0.6448	+	0.5738	–	0.8569
	or09	–	0.7087	–	0.0789	–	0.0654	–	0.8849
	or10	+	0.7809	–	0.8245	–	0.2130	+	0.7319
	or18	–	0.9541	–	0.0035	–	0.0401	–	0.6482
	or97	+	0.4236	–	0.1347	–	0.0646	–	0.2072
	sd08	–	0.9707	–	0.8816	+	0.9533	+	0.7151
	sd99	+	0.2204	–	0.7566	+	0.3984	–	0.9387
	tx03	–	0.4019	+	0.8528	+	0.5825	+	0.1418
	tx10	–	0.5409	+	0.9896	–	0.7231	+	0.7486
	tx16	+	0.1946	+	0.3135	+	0.3599	+	0.3830
	tx21	+	0.4313	+	0.1621	+	0.1219	–	0.9975
	tx56	+	0.8017	+	0.1682	+	0.3072	–	0.5827
	wa14	+	0.5786	+	0.5256	–	0.9915	+	0.3782
	wa21	–	0.3729	–	0.2221	–	0.5770	+	0.1022
	wy02	–	0.3546	+	0.1739	–	0.2736	+	0.2624
	wy08	+	0.2385	–	0.0618	–	0.1747	–	0.3696
	wy99	+	0.5726	+	0.0889	+	0.1105	+	0.0562

Table A.11 (continued).

Region	Site	Ammonium 1995 Effect	Ammonium p	Calcium 1995 Effect	Calcium p	Magnesium 1995 Effect	Magnesium p	Potassium 1995 Effect	Potassium p	Sodium 1995 Effect	Sodium p
NE	il11	+	0.5340	+	0.1178	+	0.0143	+	0.0205	+	0.0143
	il18	–	0.3913	+	0.9633	–	0.6925	–	0.4147	–	0.2060
	il63	+	0.9431	+	0.4679	+	0.1575	+	0.0141	+	0.3479
	in20	+	0.0383	+	0.0056	+	0.0001	+	0.0007	+	0.0053
	in34	+	0.0544	+	0.3856	+	0.2704	+	0.0244	+	0.0412
	in41	+	0.0385	+	0.0040	+	0.0163	+	0.0168	+	0.0102
	ky03	–	0.9717	+	0.0366	+	0.7383	+	0.4537	+	0.5744
	ky22	+	0.1020	+	0.0051	+	0.0017	+	0.0149	+	0.0528
	ky38	–	0.8138	+	0.1839	+	0.2538	+	0.8471	+	0.2848
	ma08	+	0.4144	+	0.0217	+	0.0023	+	0.0007	+	0.0431
	ma13	+	0.3921	+	0.2830	+	0.0676	+	0.0501	+	0.0630
	md03	–	0.2565	+	0.7039	+	0.2587	+	0.8291	+	0.1050
	md13	+	0.6499	+	0.6129	+	0.3400	+	0.3066	+	0.2917
	me00	–	0.4995	+	0.6915	+	0.0098	–	0.4293	+	0.0853
	me09	–	0.9367	+	0.4568	+	0.0156	+	0.3876	+	0.0251
	mi09	+	0.1130	+	0.0927	+	0.0307	+	0.2803	+	0.1320
	mi26	+	0.0084	+	0.0206	+	0.0230	+	0.0100	+	0.1476
	mi53	–	0.8127	+	0.6387	+	0.5392	+	0.6557	+	0.3658
	mi98	–	0.1797	+	0.9289	+	0.1750	–	0.3955	+	0.1091
	mi99	–	0.8368	+	0.3061	+	0.0249	+	0.1517	+	0.1234
	nh02	+	0.2087	+	0.2511	+	0.0249	+	0.0278	+	0.0346
	nj99	+	0.8339	+	0.5807	+	0.3425	+	0.2586	+	0.5726
	ny08	+	0.7842	+	0.2234	+	0.1739	+	0.0111	+	0.1525
	ny20	+	0.1176	+	0.1332	+	0.0122	+	0.0193	+	0.0183
	ny52	+	0.2207	+	0.0265	+	0.0072	+	0.0001	+	0.0001
	ny65	+	0.4637	+	0.3899	+	0.0977	+	0.0101	+	0.0136
	ny68	+	0.5943	–	0.9328	+	0.6234	–	0.7654	+	0.5846
	ny98	+	0.3367	+	0.3829	+	0.0403	+	0.1628	+	0.0391
	ny99	+	0.8746	+	0.2553	+	0.0219	+	0.5024	+	0.0828
	oh17	–	0.6965	+	0.4229	+	0.4035	+	0.8990	+	0.1705
	oh49	+	0.6909	+	0.1326	+	0.0779	+	0.6124	+	0.3102
	oh71	+	0.9962	+	0.7099	+	0.5317	+	0.5771	+	0.1406
	pa15	+	0.5247	+	0.0916	+	0.0515	+	0.1152	+	0.0100
	pa29	+	0.1750	+	0.2664	+	0.0672	+	0.1023	+	0.1108
	pa42	–	0.8651	+	0.3837	+	0.3007	+	0.5258	+	0.1716
	pa72	+	0.6322	+	0.9797	+	0.6329	+	0.3974	+	0.6661
	va00	+	0.6405	+	0.1662	+	0.0362	+	0.1506	+	0.0318
	va13	–	0.9243	+	0.5813	+	0.3554	+	0.3968	+	0.1720
	va28	–	0.3470	+	0.7514	+	0.0005	+	0.5747	+	0.0017
	vt01	+	0.5234	–	0.5057	+	0.8141	+	0.5907	+	0.5961
	vt99	–	0.8085	–	0.6729	+	0.0316	+	0.1000	+	0.0300
	wi28	+	0.2904	+	0.1565	+	0.1045	+	0.0904	+	0.0198
	wi36	–	0.7135	+	0.4225	+	0.3083	+	0.3120	+	0.2387
	wi37	–	0.3520	+	0.6271	+	0.2194	+	0.0025	+	0.0788
	wi99	–	0.9410	+	0.7264	+	0.5925	+	0.7050	+	0.6977
	wv04	+	0.1137	+	0.0326	+	0.0024	+	0.1271	+	0.0030
	wv18	+	0.1878	+	0.9342	+	0.0353	–	0.7540	+	0.0480
SE	al10	+	0.1936	+	0.8094	+	0.4961	–	0.5431	+	0.5652
	fl03	+	0.4808	+	0.9130	+	0.6310	+	0.2239	+	0.6719
	fl11	+	0.8174	+	0.4715	–	0.4255	+	0.8790	–	0.4504
	fl41	–	0.6142	–	0.3703	+	0.7035	+	0.2021	+	0.6321
	ga41	+	0.0982	+	0.0018	+	0.0193	+	0.3655	+	0.0397
	ms10	+	0.3354	+	0.1624	+	0.1740	+	0.6673	+	0.1016
	ms30	+	0.4156	+	0.1122	+	0.1118	+	0.3329	+	0.1742

Table A.11 (continued).

Region	Site	Ammonium 1995 Effect	Ammonium p	Calcium 1995 Effect	Calcium p	Magnesium 1995 Effect	Magnesium p	Potassium 1995 Effect	Potassium p	Sodium 1995 Effect	Sodium p
	nc03	+	0.9117	+	0.3667	+	0.0888	+	0.5914	+	0.0448
	nc25	+	0.2411	+	0.1601	+	0.7207	+	0.2691	–	0.7733
	nc34	+	0.2129	+	0.1917	+	0.5076	+	0.5151	–	0.7033
	nc36	–	0.9839	+	0.4437	+	0.1064	+	0.5035	+	0.1706
	nc41	–	0.5598	+	0.2626	+	0.0946	–	0.1359	+	0.0232
	sc06	–	0.8070	–	0.7422	–	0.4437	–	0.6860	+	0.9992
	tn00	+	0.1278	+	0.0014	+	0.0003	+	0.0001	+	0.3651
	tn11	+	0.1698	+	0.4095	+	0.1659	+	0.4194	+	0.3161
West	ar02	+	0.6368	+	0.0049	+	0.2750	+	0.2166	–	0.4586
	ar03	+	0.0848	+	0.0192	+	0.4316	+	0.4344	–	0.7732
	ar27	+	0.3018	+	0.1534	+	0.6656	–	0.6617	+	0.8977
	az03	+	0.7425	–	0.8635	–	0.9902	+	0.6934	+	0.6219
	co00	+	0.4683	+	0.2260	+	0.0380	+	0.2906	+	0.0709
	co02	–	0.6239	+	0.1169	+	0.0364	+	0.1170	+	0.4255
	co15	–	0.7914	+	0.5070	+	0.1888	+	0.6070	+	0.2439
	co19	+	0.8185	–	0.8731	+	0.2544	–	0.3551	+	0.3999
	co22	+	0.1700	+	0.1890	+	0.0475	+	0.3008	+	0.2023
	co97	–	0.5273	+	0.6362	+	0.5378	–	0.3333	–	0.6053
	co98	+	0.5875	+	0.3787	+	0.1267	+	0.2795	+	0.7397
	co99	+	0.2475	+	0.9349	+	0.8457	+	0.3392	+	0.4642
	ia08	–	0.1959	+	0.0844	+	0.1026	+	0.0391	+	0.3078
	ia23	+	0.9914	+	0.2938	+	0.2137	+	0.0635	+	0.0148
	id03	–	0.7259	+	0.0387	+	0.0279	+	0.0196	+	0.2876
	id11	–	0.0849	–	0.7589	+	0.8365	–	0.7903	–	0.6093
	ks31	+	0.7409	–	0.8818	+	0.9208	+	0.5381	+	0.5208
	ks32	–	0.7635	+	0.7529	+	0.2693	+	0.7741	+	0.1839
	la12	+	0.3797	+	0.1062	+	0.1750	+	0.2561	+	0.2321
	la30	+	0.0742	+	0.0116	+	0.0838	+	0.0310	+	0.1877
	mn16	–	0.6023	–	0.4796	–	0.6499	–	0.5314	+	0.2014
	mn23	–	0.0561	+	0.7968	+	0.7644	+	0.8442	+	0.3728
	mo03	+	0.2720	+	0.2183	+	0.1278	+	0.1026	+	0.8405
	mt00	–	0.7002	–	0.3288	–	0.6323	+	0.6457	+	0.3255
	mt05	+	0.9852	–	0.0613	–	0.4884	–	0.0481	+	0.4462
	nd08	–	0.9186	–	0.3264	–	0.3830	–	0.6611	+	0.7111
	nm07	+	0.6835	+	0.1017	+	0.0066	+	0.1084	+	0.0216
	nm08	+	0.5143	+	0.0113	+	0.0075	+	0.0032	+	0.0971
	nm09	+	0.0695	+	0.0994	+	0.0376	+	0.1077	+	0.1559
	ok00	+	0.8818	–	0.9408	+	0.9275	–	0.1445	–	0.9589
	ok17	+	0.6692	+	0.8238	–	0.7519	–	0.7168	+	0.7985
	or09	–	0.2182	–	0.1742	–	0.7202	+	0.7682	+	0.8144
	or10	+	0.9427	+	0.4948	+	0.7203	+	0.2904	+	0.7573
	or18	–	0.2092	–	0.8220	+	0.3759	–	0.5595	+	0.9929
	or97	–	0.2719	–	0.6453	–	0.2383	–	0.0321	–	0.2957
	sd08	–	0.7290	+	0.7656	+	0.4205	+	0.3060	+	0.4863
	sd99	–	0.3653	–	0.2834	–	0.1813	+	0.2162	+	0.7081
	tx03	+	0.9867	+	0.2823	+	0.2672	+	0.4973	+	0.1228
	tx10	–	0.4040	+	0.1541	+	0.5095	–	0.1482	+	0.5448
	tx16	+	0.4199	–	0.9343	+	0.3455	+	0.6948	+	0.2474
	tx21	+	0.0325	+	0.0214	+	0.6390	–	0.9876	+	0.8356
	tx56	–	0.9059	+	0.1346	+	0.2287	+	0.7734	+	0.7215
	wa14	+	0.0619	+	0.6820	+	0.4258	+	0.4958	+	0.4573
	wa21	+	0.8257	+	0.3985	+	0.0912	+	0.1727	+	0.0860
	wy02	+	0.7797	+	0.4672	+	0.0507	+	0.1847	+	0.0125
	wy08	–	0.4515	–	0.1102	–	0.4258	+	0.9944	–	0.2457
	wy99	+	0.2571	+	0.2811	+	0.0570	+	0.2747	+	0.0361

Table A.12. Comparison of 1983-1994 mean annual and bi-monthly precipitation at NADP/NTN sites with 1995 precipitation observations.

Region	Site	Annual Precip. (Inches)		January-February Precip. (Inches)		March-April Precip. (Inches)		May-June Precip. (Inches)		July-August Precip. (Inches)		September-October Precip. (Inches)		November-December Precip. (Inches)	
		Mean	1995	Mean	1995	Mean	1995	Mean	1995	Mean	1995	Mean	1995	Mean	1995
NE	il11	35.54	31.37	2.93	2.22	5.94	6.05	6.69	11.60	7.17	4.74	6.40	3.86	6.41	2.90
	il18	34.23	32.51	1.95	2.14	4.72	5.61	7.53	8.14	8.63	7.20	6.39	5.56	5.01	3.86
	il63	50.09	53.35	6.84	8.40	9.18	11.50	8.57	14.09	7.09	8.16	8.27	4.10	10.14	7.10
	in20	35.88	28.60	3.60	3.40	5.46	6.65	6.85	8.87	7.31	3.03	6.58	3.03	6.09	3.62
	in34	37.45	33.12	3.21	4.26	5.55	7.49	7.34	5.24	7.53	8.10	7.42	3.77	6.41	4.26
	in41	36.27	28.87	2.95	1.47	6.52	6.08	6.17	8.91	7.84	3.75	6.55	5.55	6.25	3.11
	ky03	44.16	42.16	7.32	3.62	6.93	9.03	8.18	14.31	8.29	4.98	5.84	7.18	7.60	3.04
	ky22	45.05	42.42	6.81	8.89	7.81	6.44	8.66	10.83	8.80	2.93	5.70	6.46	7.26	6.87
	ky38	48.68	42.81	9.29	8.07	7.35	7.84	8.00	9.17	7.14	7.37	6.98	4.25	9.93	6.11
	ma08	48.47	44.78	6.25	5.68	8.13	4.07	8.22	6.88	9.46	4.58	8.12	16.42	8.29	7.15
	ma13	42.72	32.45	5.73	4.58	7.80	3.90	6.35	3.45	7.46	3.62	7.03	9.32	8.35	7.58
	md03	39.17	38.94	5.53	5.82	6.88	4.13	6.45	5.70	7.03	6.11	6.46	9.78	6.82	7.40
	md13	39.36	39.80	5.85	5.39	7.52	5.07	6.53	7.93	7.48	4.57	5.95	10.83	6.03	6.01
	me00	36.06	34.71	4.51	8.10	4.81	4.55	6.65	3.36	7.73	4.75	6.22	7.39	6.14	6.56
	me09	42.72	45.47	5.15	5.93	7.87	3.96	7.91	7.30	7.77	7.20	6.98	10.40	7.04	10.68
	mi09	32.27	37.62	3.13	2.80	4.99	6.30	5.04	4.80	5.93	9.20	7.46	9.58	5.71	4.94
	mi26	40.40	31.72	3.34	2.27	6.36	5.10	6.92	5.38	8.35	9.13	9.17	5.28	6.26	4.56
	mi53	40.59	34.65	4.47	5.29	6.09	5.25	6.59	3.51	6.96	6.75	9.48	6.36	7.00	7.49
	mi98	33.85	37.52	3.14	3.54	4.93	6.43	5.29	5.10	6.53	4.73	7.89	13.33	6.07	4.39
	mi99	31.04	34.55	3.13	4.51	3.56	3.89	6.12	5.27	6.19	5.60	6.15	10.52	5.90	4.76
	nh02	46.35	45.54	6.20	5.99	7.15	4.79	8.17	4.23	8.91	10.85	7.65	11.22	8.27	8.46
	nj99	45.25	39.11	5.79	5.79	8.19	4.19	7.81	3.92	9.18	6.12	6.35	12.26	7.93	6.83
	ny08	32.71	29.51	2.78	3.02	5.79	2.94	6.26	2.07	6.25	8.74	6.55	8.49	5.07	4.25
	ny20	42.00	41.16	5.23	6.28	6.95	3.62	6.99	2.12	7.08	9.49	8.06	11.87	7.68	7.78
	ny52	52.47	42.14	7.40	4.61	7.92	3.11	7.86	3.59	8.30	5.61	10.05	14.31	10.94	10.91
	ny65	31.01	26.06	2.41	3.41	5.27	3.31	6.22	3.94	6.81	2.64	5.82	9.49	4.47	3.27
	ny68	51.53	49.17	6.95	7.42	9.53	6.28	8.32	6.53	9.23	5.00	8.10	14.71	9.40	9.23
	ny98	43.59	42.95	5.65	6.06	7.09	4.31	7.41	3.11	8.01	9.39	8.54	12.68	6.88	7.40
	ny99	50.17	42.12	5.98	5.69	8.51	5.10	9.58	2.48	9.05	6.69	8.23	14.23	8.82	7.93
	oh17	35.18	47.17	3.87	7.82	6.08	6.22	6.20	11.13	7.01	11.94	5.18	4.72	6.84	5.34
	oh49	37.82	41.02	4.40	7.28	7.01	6.40	6.66	8.14	7.55	6.84	5.15	6.57	7.06	5.79
	oh71	33.41	33.16	3.21	4.80	5.49	4.42	6.36	6.53	7.18	8.15	5.60	5.73	5.57	3.53
	pa15	40.11	37.19	4.84	5.00	7.24	3.75	6.74	8.43	7.87	3.20	6.02	10.89	7.40	5.92
	pa29	50.31	38.16	5.81	5.44	8.86	5.28	9.15	7.73	8.95	5.12	8.15	8.23	9.39	6.36
	pa42	42.32	33.43	5.13	4.51	7.92	3.94	7.87	7.41	7.37	2.82	6.45	8.91	7.56	5.84
	pa72	45.84	36.55	5.66	4.27	7.75	6.55	8.62	2.71	8.81	4.97	8.23	10.53	6.77	7.52
	va00	44.58	47.35	5.83	6.64	7.70	4.28	7.68	12.57	9.51	6.96	6.34	10.11	7.52	6.79
	va13	37.68	41.47	4.96	8.78	7.69	4.24	6.63	9.44	6.97	5.78	5.75	6.82	5.69	6.41
	va28	54.57	64.97	7.15	11.03	9.68	5.22	9.08	14.11	9.38	13.80	8.48	13.73	10.80	7.08
	vt01	41.00	38.45	4.53	4.93	6.97	5.43	7.45	4.31	8.53	9.00	6.61	8.69	6.91	6.09
	vt99	44.09	46.32	4.41	3.89	6.76	4.71	7.27	3.76	10.23	15.40	8.72	12.71	6.70	5.85
	wi28	27.34	30.29	0.88	0.61	3.50	3.41	6.43	3.89	7.02	13.49	6.70	6.69	2.81	2.20
	wi36	31.09	31.95	1.84	0.91	3.89	4.01	6.39	5.89	7.58	9.74	7.52	8.54	3.88	2.86
	wi37	30.02	32.87	1.12	0.54	4.05	4.68	6.79	4.81	8.70	14.00	6.69	7.05	2.68	1.79
	wi99	32.05	35.15	2.63	2.31	5.13	5.86	5.53	5.76	7.12	10.94	6.61	5.57	5.03	4.71
	wv04	47.21	44.13	6.73	9.04	8.74	6.26	7.97	10.86	9.10	5.19	6.79	7.13	7.89	5.65
	wv18	49.92	41.92	6.71	5.81	8.85	5.45	9.42	7.82	9.34	9.89	7.15	5.84	8.43	7.11
SE	al10	46.00	60.37	9.16	10.35	7.55	11.09	6.61	4.23	8.01	6.99	5.55	15.16	9.13	12.55
	fl03	51.18	54.55	7.83	4.51	7.86	8.50	8.77	11.37	12.62	19.13	9.16	6.60	4.94	4.44
	fl11	50.41	67.81	4.41	3.50	4.57	4.24	14.23	20.45	13.40	19.93	11.03	18.21	2.76	1.48
	fl41	50.01	59.75	4.54	4.43	7.32	7.33	10.79	12.21	14.98	21.49	8.71	10.70	3.67	3.59
	ga41	46.16	42.29	8.41	10.27	8.21	3.66	6.16	2.61	9.09	6.28	6.36	10.77	7.94	8.70
	ms10	52.36	50.03	10.60	3.68	9.29	16.42	8.05	6.30	7.49	7.15	6.85	5.92	10.08	10.56
	ms30	53.40	55.52	8.63	11.07	9.14	14.35	9.78	5.80	7.19	11.06	7.32	3.69	11.33	9.55
	nc03	45.74	48.29	6.89	7.98	7.60	6.11	7.37	8.52	11.68	9.13	6.88	10.35	5.32	6.20
	nc25	69.54	72.69	13.20	17.03	12.57	8.37	10.16	10.15	10.56	12.16	10.29	15.18	12.76	9.80
	nc34	41.43	52.25	7.01	8.39	8.11	3.19	6.78	10.93	6.72	12.58	6.56	11.52	6.26	5.64
	nc36	46.22	49.36	6.87	10.08	6.58	4.29	7.68	9.78	12.23	10.47	6.52	10.46	6.35	4.28
	nc41	42.17	52.11	7.00	10.81	7.01	5.20	7.83	10.05	8.71	8.63	6.06	11.78	5.55	5.64
	sc06	43.76	56.26	6.78	10.10	6.02	5.42	6.76	9.27	10.60	17.08	8.24	7.86	5.36	6.53
	tn00	51.04	49.24	9.10	10.69	8.37	7.64	8.58	7.88	8.56	4.32	6.55	8.98	9.88	9.73
	tn11	57.10	55.68	9.87	12.35	10.23	7.48	9.71	10.93	11.13	4.65	6.24	9.98	9.93	10.29

Table A.12 (continued).

Region	Site	Annual Precip. (Inches) Mean	Annual Precip. (Inches) 1995	January-February Precip. (Inches) Mean	January-February Precip. (Inches) 1995	March-April Precip. (Inches) Mean	March-April Precip. (Inches) 1995	May-June Precip. (Inches) Mean	May-June Precip. (Inches) 1995	July-August Precip. (Inches) Mean	July-August Precip. (Inches) 1995	September-October Precip. (Inches) Mean	September-October Precip. (Inches) 1995	November-December Precip. (Inches) Mean	November-December Precip. (Inches) 1995
West	ar02	56.06	39.89	9.80	8.63	9.66	10.17	8.79	5.55	7.06	5.23	9.31	3.61	11.44	6.70
	ar03	57.29	42.84	8.17	8.46	10.41	8.24	9.33	10.22	8.55	5.35	8.99	4.95	11.83	5.62
	ar27	46.42	42.74	4.97	5.42	8.93	10.56	8.98	10.73	5.46	4.56	9.25	6.44	8.83	5.03
	az03	14.60	19.86	3.13	6.18	2.63	5.14	0.88	0.52	3.16	4.53	2.29	2.66	2.51	0.83
	co00	7.81	7.03	0.54	0.19	1.17	1.30	1.25	0.84	2.29	2.85	1.33	1.64	1.23	0.21
	co02	58.62	90.10	12.83	17.94	14.52	26.21	5.33	15.66	4.99	4.30	4.60	6.60	16.36	19.39
	co15	13.08	16.51	1.66	1.19	2.44	4.17	2.21	5.14	2.20	1.80	2.41	2.95	2.16	1.26
	co19	15.21	20.44	1.32	1.42	3.43	4.95	3.31	7.25	2.92	2.83	2.19	2.21	2.03	1.78
	co22	12.45	15.95	0.59	0.36	2.28	1.35	3.38	9.58	3.54	2.09	1.75	2.24	0.90	0.33
	co97	35.52	59.00	6.57	11.69	7.90	14.10	4.27	10.25	4.54	3.78	4.74	6.86	7.50	12.32
	co98	40.25	52.60	6.21	7.90	9.75	13.60	5.79	12.29	5.39	5.77	5.89	5.89	7.23	7.15
	co99	18.79	16.91	3.01	2.98	3.20	5.32	1.72	1.69	3.82	3.55	3.34	2.07	3.71	1.30
	ia08	32.09	30.00	1.99	0.70	5.83	7.54	6.91	6.71	7.27	7.62	6.06	4.40	4.03	3.03
	ia23	35.24	36.35	1.76	1.10	5.12	7.01	7.39	14.48	10.40	6.82	7.37	4.48	3.20	2.46
	id03	12.03	17.58	2.29	2.61	1.97	4.59	2.43	6.30	1.68	1.01	1.47	0.48	2.20	2.59
	id11	9.72	12.87	1.95	1.92	1.98	2.60	2.12	3.05	0.57	1.30	1.11	0.77	2.00	3.23
	ks31	32.39	39.10	1.61	0.93	4.97	7.81	8.53	19.06	8.88	5.99	5.52	3.94	2.88	1.37
	ks32	18.64	20.55	1.11	0.86	2.70	3.27	5.31	10.01	6.10	4.30	2.25	1.93	1.17	0.18
	la12	59.82	62.50	10.97	3.78	8.27	15.37	12.70	7.27	11.87	12.87	8.51	10.36	7.49	12.85
	la30	62.85	68.27	12.78	11.91	10.55	18.22	11.44	14.09	11.39	6.81	7.20	7.15	9.49	10.09
	mn16	30.45	35.03	1.65	1.92	3.32	2.54	7.99	4.76	8.93	11.09	5.78	11.22	2.78	3.50
	mn23	27.51	32.67	1.13	1.56	4.09	5.18	8.14	5.18	6.99	9.16	4.97	9.65	2.20	1.94
	mo03	42.55	51.17	3.65	5.57	7.51	7.79	8.21	17.90	8.54	14.29	6.94	2.84	7.71	2.78
	mt00	12.47	13.34	0.71	1.20	2.31	3.30	3.64	4.07	2.28	1.99	2.42	1.99	1.12	0.79
	mt05	30.18	41.33	5.27	6.71	4.24	4.54	5.56	7.37	3.21	5.58	4.51	6.48	7.39	10.65
	nd08	17.55	22.88	1.01	1.40	1.64	1.65	5.50	2.69	5.76	9.79	2.27	4.50	1.38	2.85
	nm07	17.66	12.33	1.93	1.59	2.16	2.04	2.50	2.09	5.31	4.61	3.46	1.60	2.30	0.40
	nm08	21.87	16.67	1.49	1.27	1.08	0.38	4.03	2.79	9.15	8.27	3.77	3.73	2.34	0.23
	nm09	13.71	12.14	1.41	1.83	1.89	2.99	1.69	1.49	3.83	4.03	2.79	1.50	2.10	0.30
	ok00	28.36	33.81	1.94	0.75	4.36	5.75	7.87	9.50	6.17	14.83	5.01	1.87	3.01	1.11
	ok17	38.62	34.20	3.75	2.30	6.76	6.03	9.13	12.69	5.17	3.83	8.72	5.40	5.08	3.95
	or09	9.50	12.55	1.60	1.74	1.61	3.54	1.89	2.35	1.16	0.73	1.31	0.24	1.92	3.95
	or10	80.17	95.49	21.23	25.15	16.77	17.38	7.59	6.91	2.00	3.58	7.63	9.94	24.95	32.53
	or18	21.11	27.04	4.20	4.22	4.17	6.04	4.24	5.04	1.70	2.41	2.20	2.21	4.60	7.12
	or97	31.81	47.14	8.13	12.61	5.19	9.28	3.54	2.75	1.30	1.30	3.07	6.38	10.58	14.82
	sd08	16.58	18.67	0.49	0.78	2.35	3.51	7.07	9.19	3.91	1.54	2.07	3.19	0.68	0.46
	sd99	21.27	26.07	0.80	0.40	3.56	6.78	7.44	7.72	5.40	6.17	3.14	4.42	0.94	0.58
	tx03	30.00	18.30	3.63	0.65	5.45	3.55	7.71	2.40	3.91	5.30	5.56	3.18	3.75	3.22
	tx10	41.86	31.49	6.57	5.67	6.60	6.05	10.60	6.97	4.73	5.97	6.51	2.80	6.85	4.03
	tx16	22.46	20.25	2.41	1.39	2.31	2.48	5.47	5.46	4.83	4.51	4.71	4.24	2.74	2.17
	tx21	50.28	39.36	7.86	7.98	8.14	12.67	9.85	6.48	5.85	4.41	7.68	3.72	10.89	4.10
	tx56	35.75	25.36	4.40	1.43	5.28	5.91	9.32	7.28	4.28	7.33	7.57	2.33	4.91	1.08
	wa14	127.16	122.35	34.12	35.25	21.70	24.29	11.11	7.22	5.46	6.35	16.84	20.19	37.94	29.05
	wa21	35.55	44.86	7.90	8.09	6.30	9.99	4.89	3.40	1.96	3.16	4.71	5.41	9.78	14.81
	wy02	16.26	24.61	1.49	2.13	3.42	4.53	4.58	10.08	1.80	1.69	3.01	4.59	1.96	1.59
	wy08	14.65	14.79	1.39	1.49	2.33	3.35	3.57	1.87	3.08	3.05	2.15	2.66	2.15	2.37
	wy99	15.58	16.90	0.91	0.68	2.31	2.64	5.09	5.96	3.49	3.56	2.55	3.55	1.22	0.51

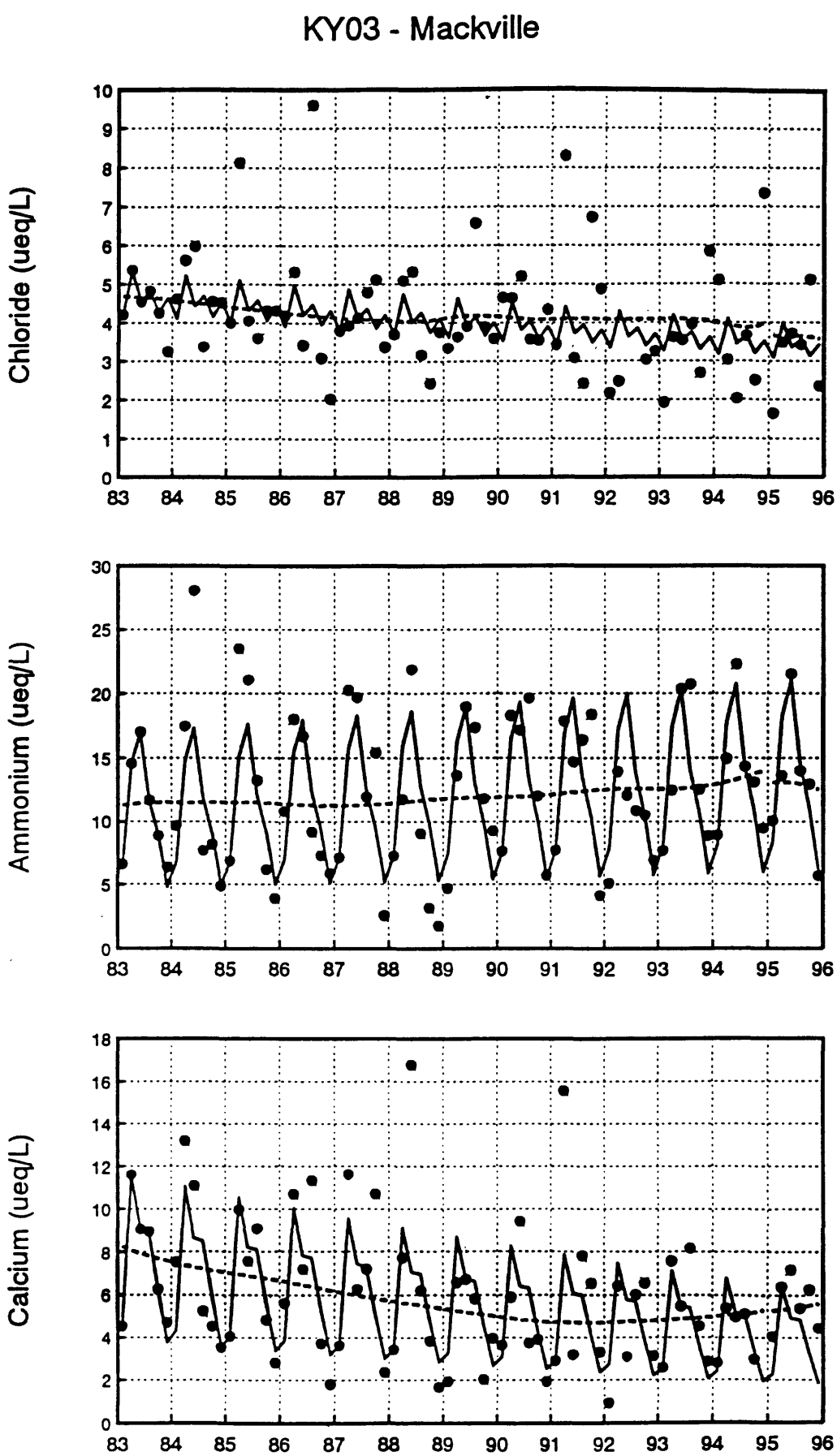


Figure A.1. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Cl^-, NH_4^+ and Ca^{2+} at Mackville, KY.

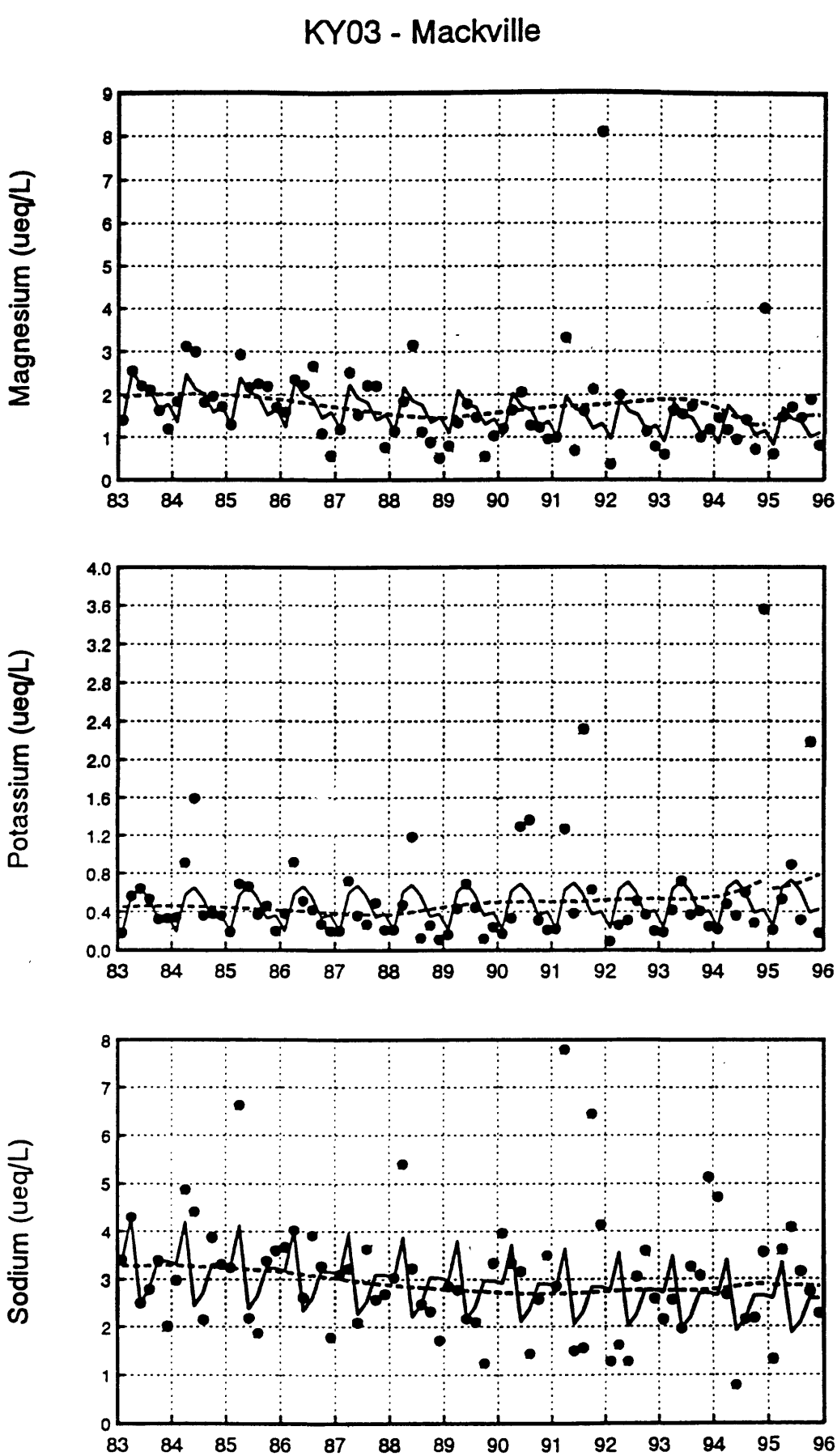


Figure A.2. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Mg^{2+}, K^{+} and Na^{+} at Mackville, KY.

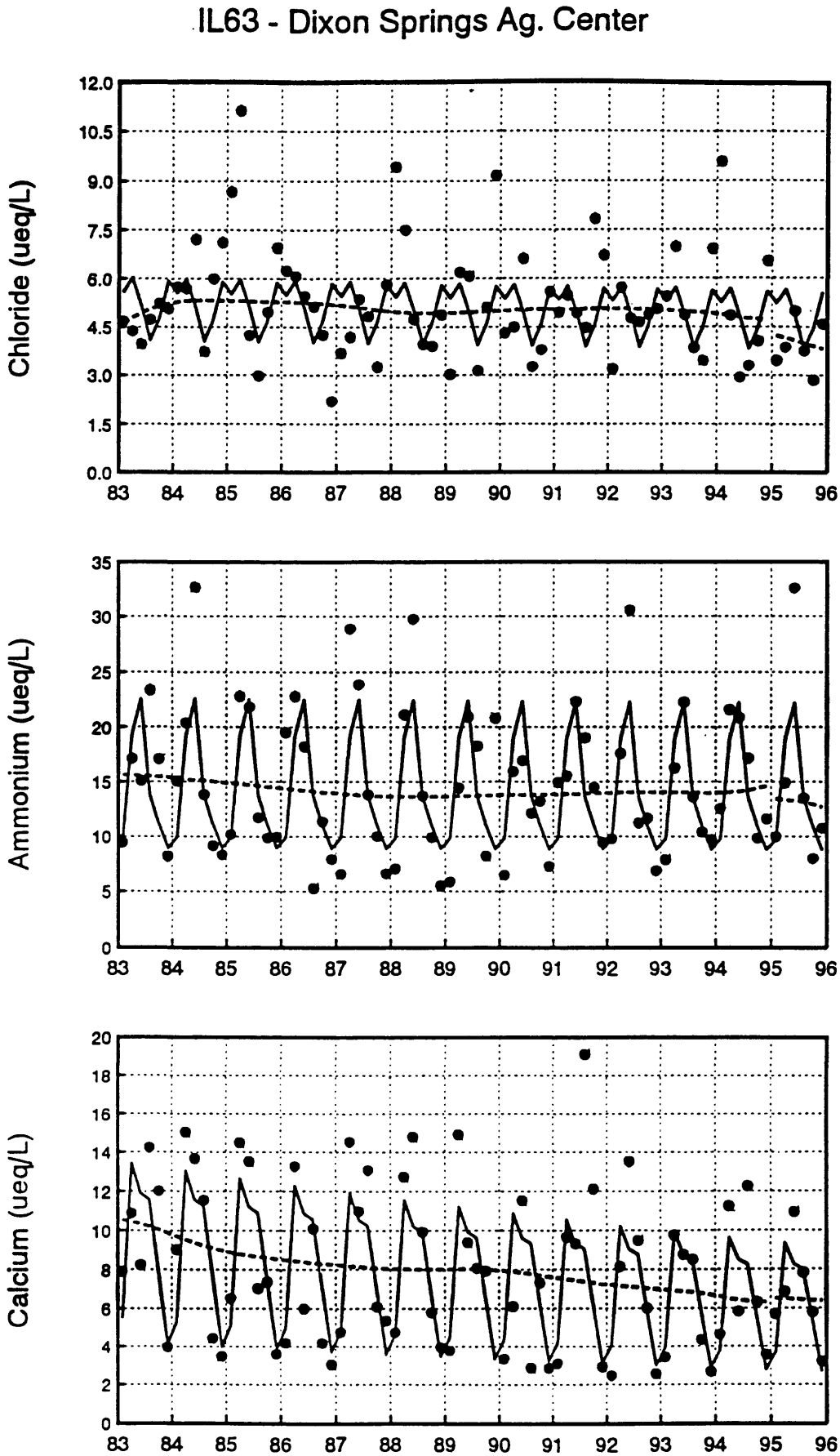


Figure A.3. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Cl^-, NH_4^+ and Ca^{2+} at Dixon Springs Agricultural Center, IL.

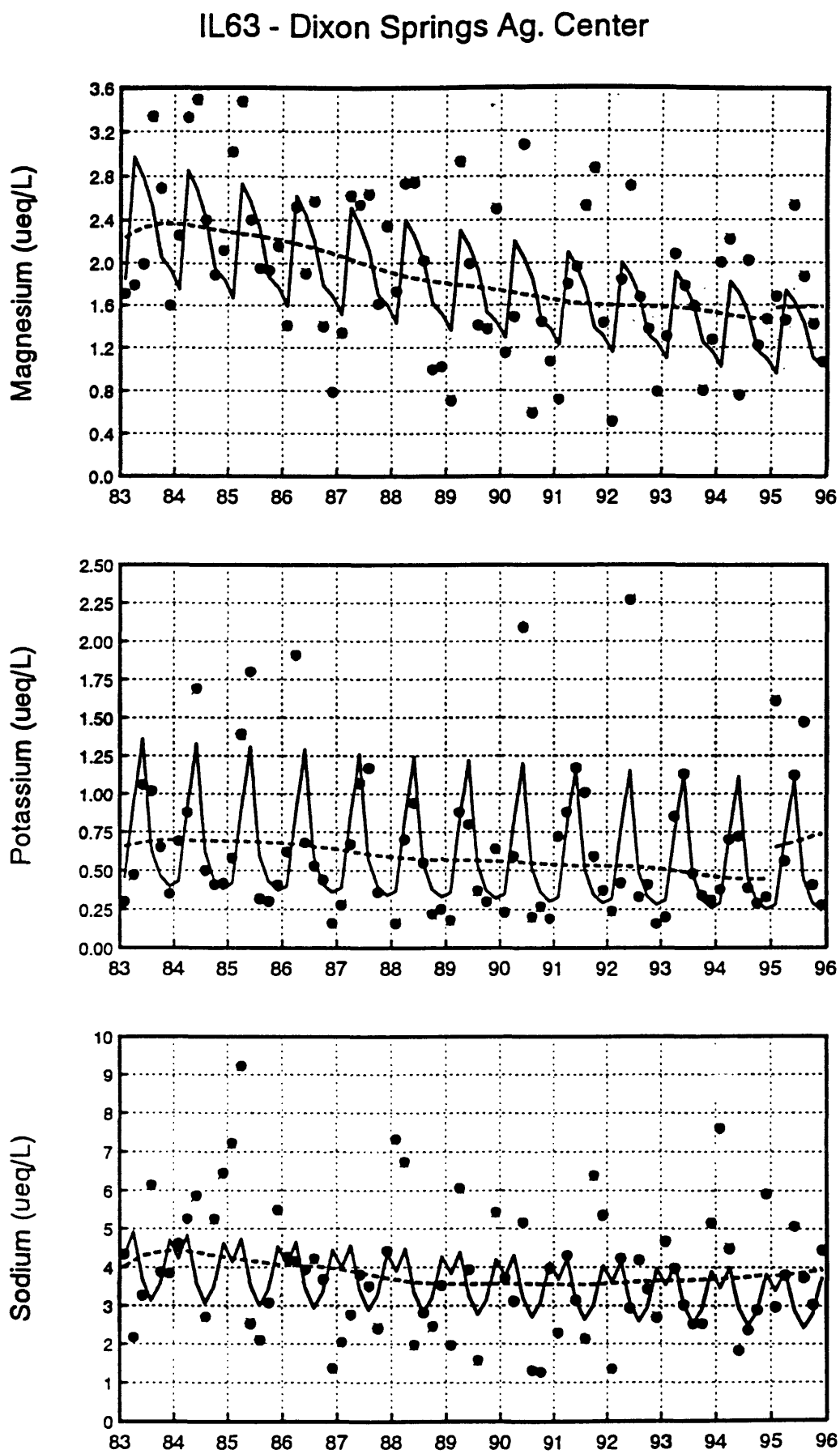


Figure A.4. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Mg^{2+}, K^{+} and Na^{+} at Dixon Springs Agricultural Center, IL.

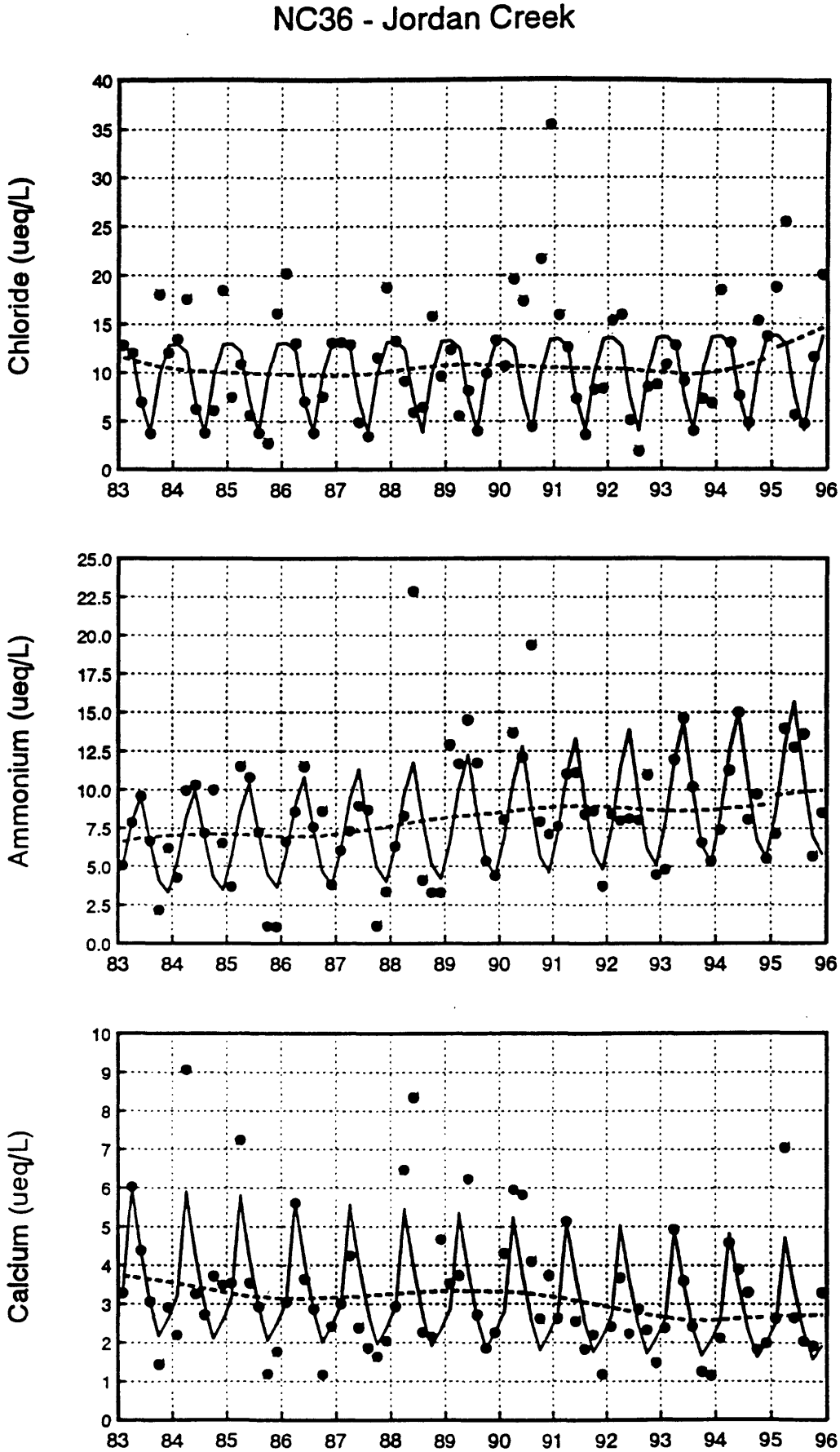


Figure A.5. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Cl^-, NH_4^+ and Ca^{2+} at Jordan Creek, NC.

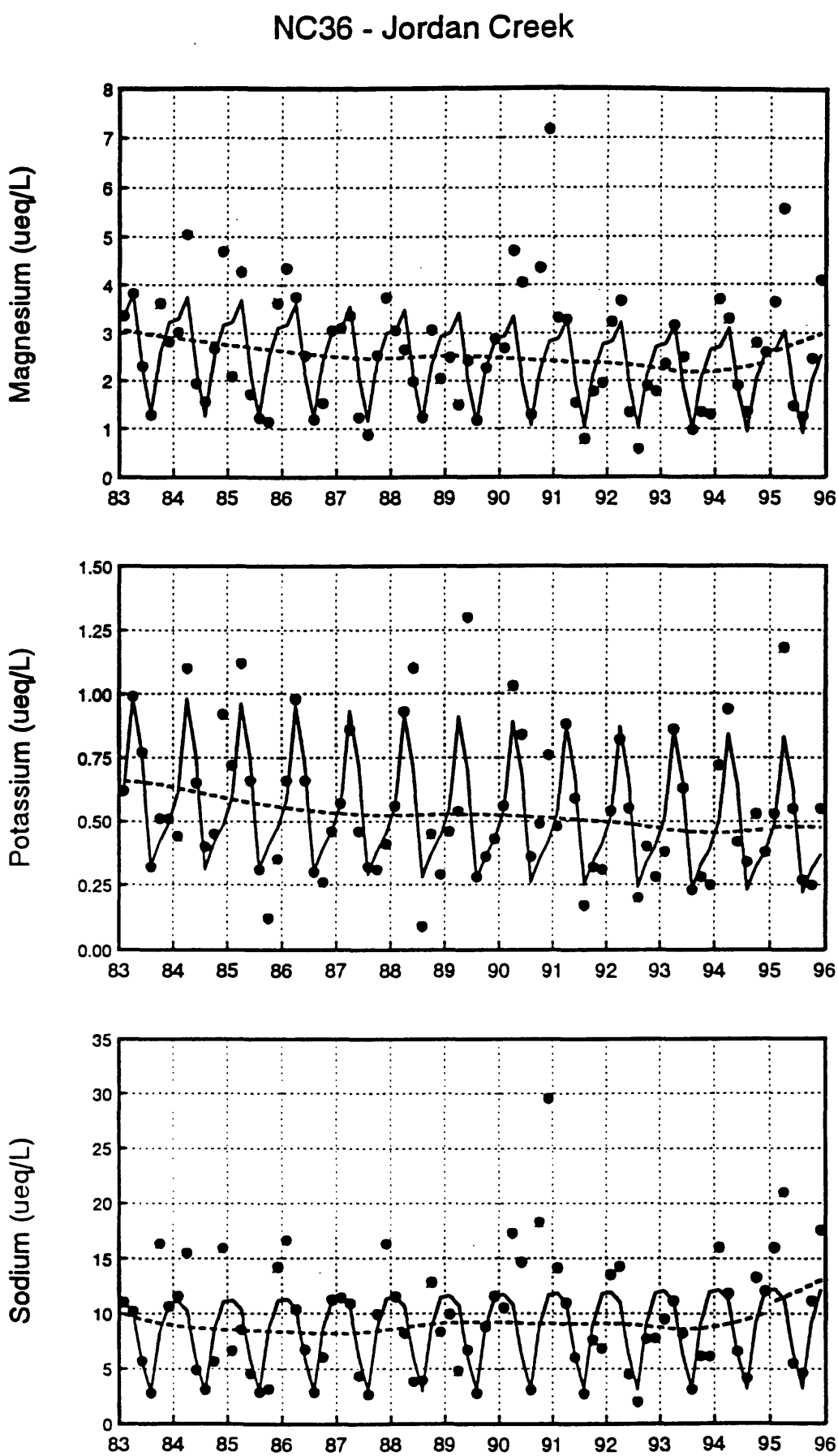


Figure A.6. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Mg^{2+}, K^{+} and Na^{+} at Jordan Creek, NC.

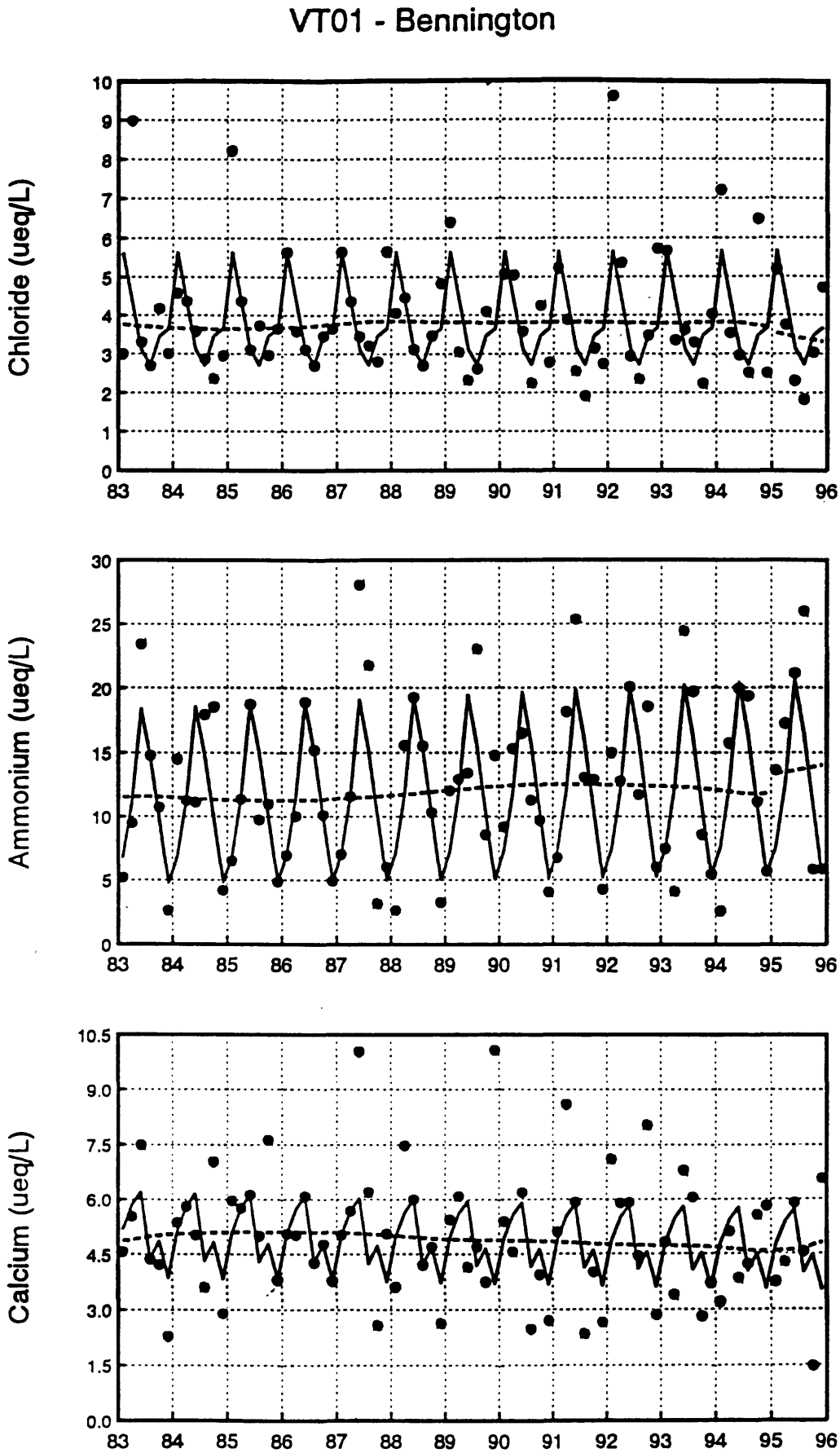


Figure A.7. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Cl^-, NH_4^+ and Ca^{2+} at Bennington, VT.

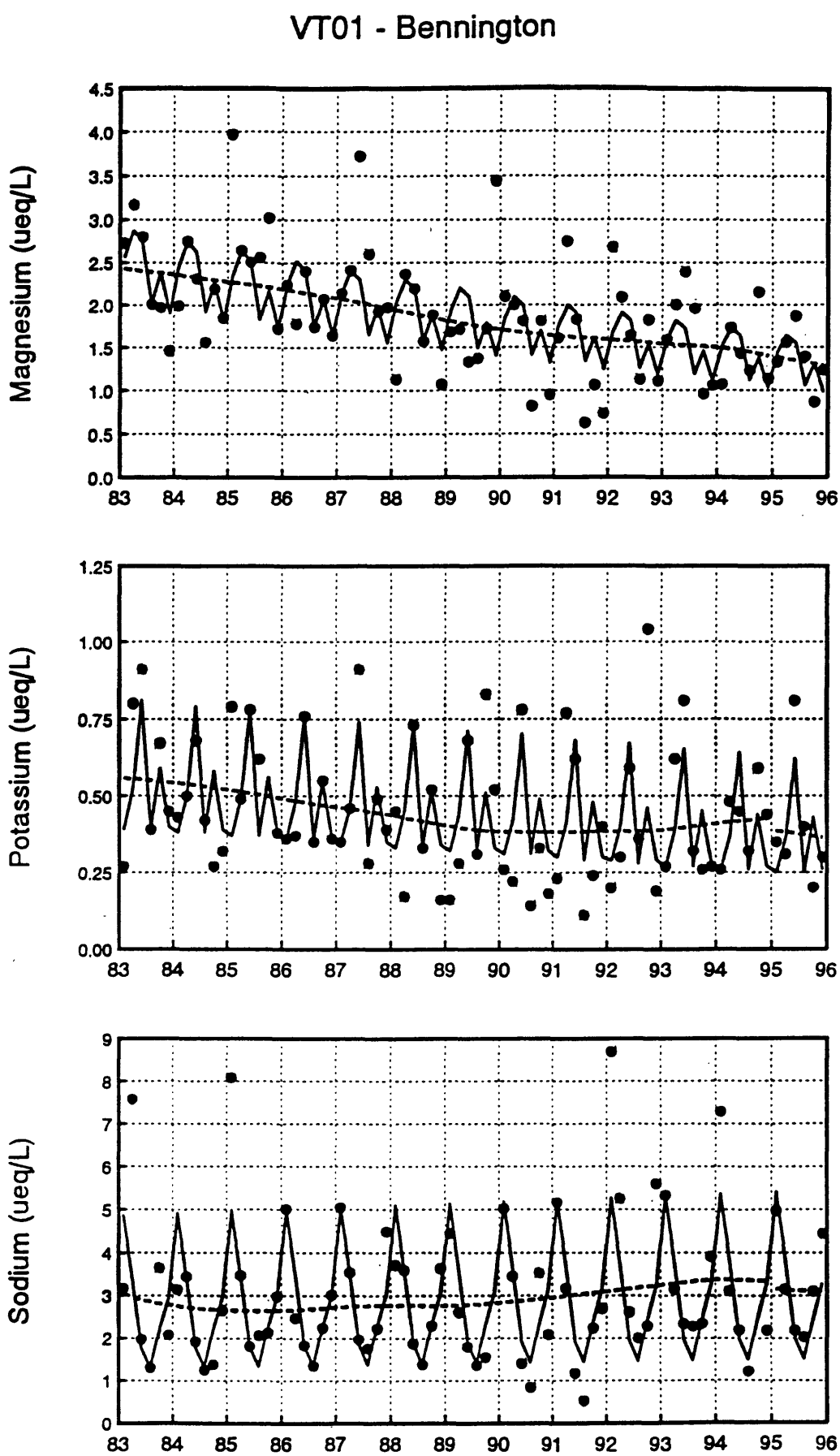


Figure A.8. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Mg^{2+}, K^{+} and Na^{+} at Bennington, VT.

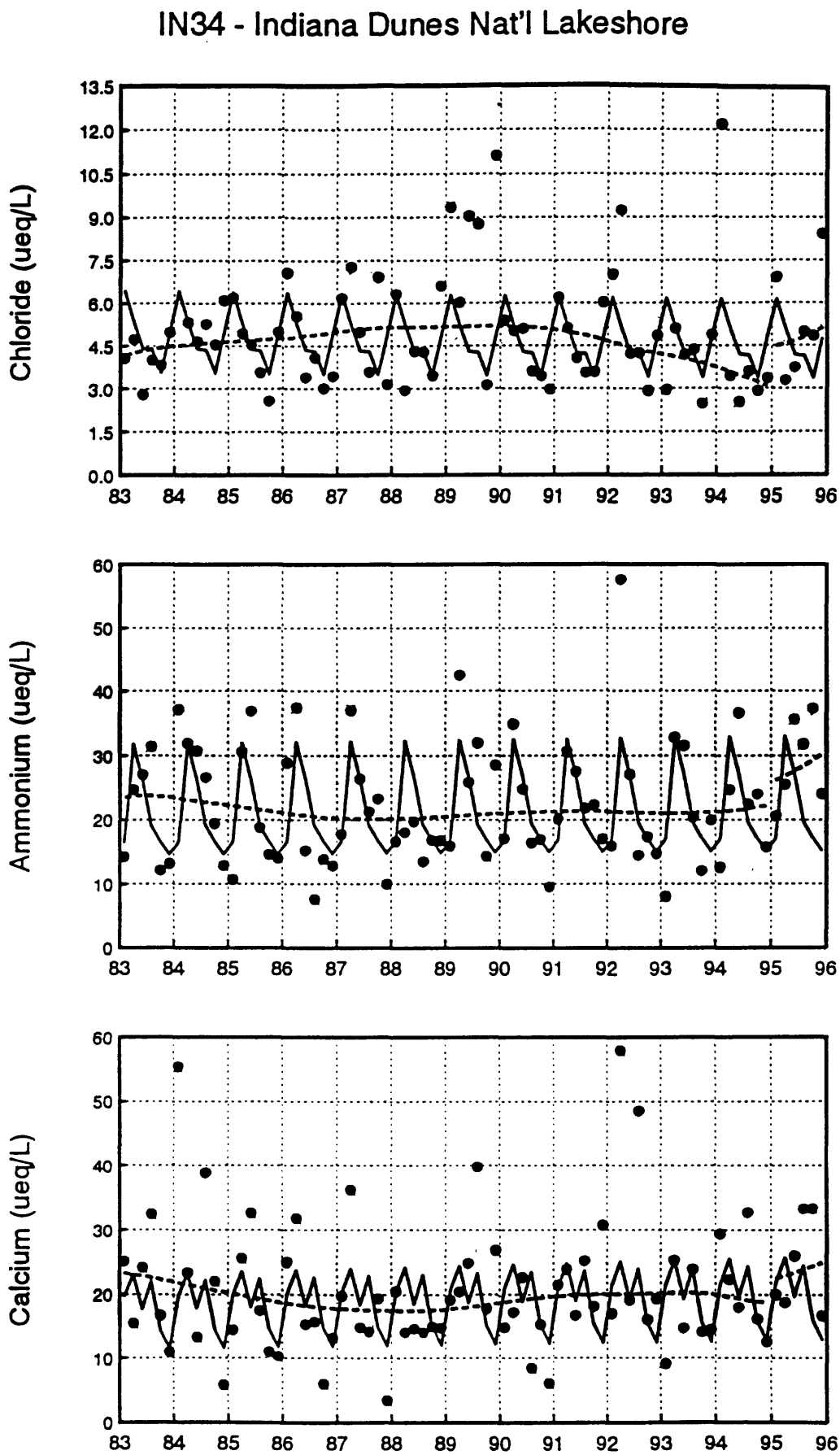


Figure A.9. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Cl^-, NH_4^+ and Ca^{2+} at Indiana Dunes Nat'l Lakeshore, IN.

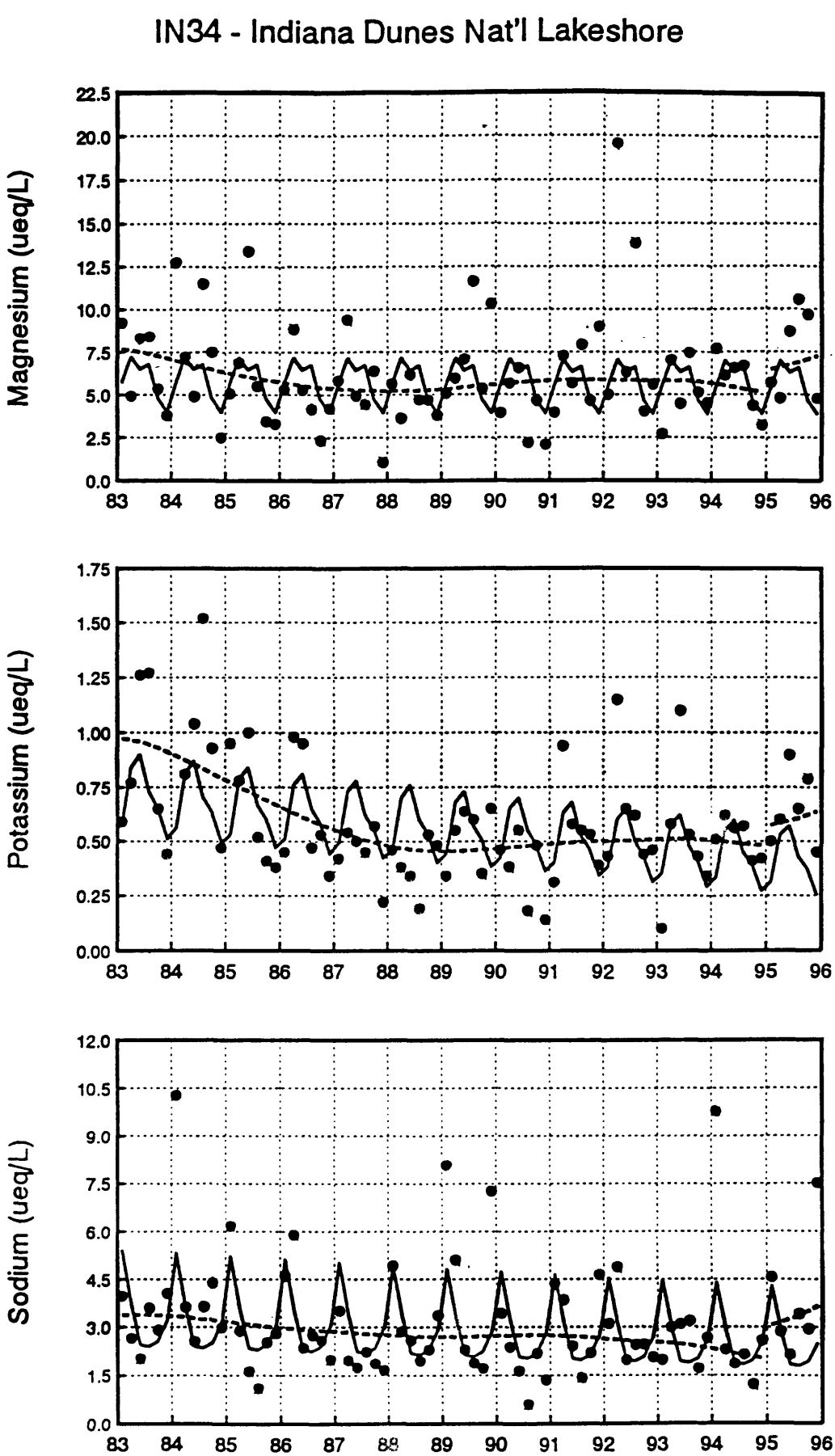


Figure A.10. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Mg^{2+}, K^{+} and Na^{+} at Indiana Dunes Nat'l Lakeshore, IN.

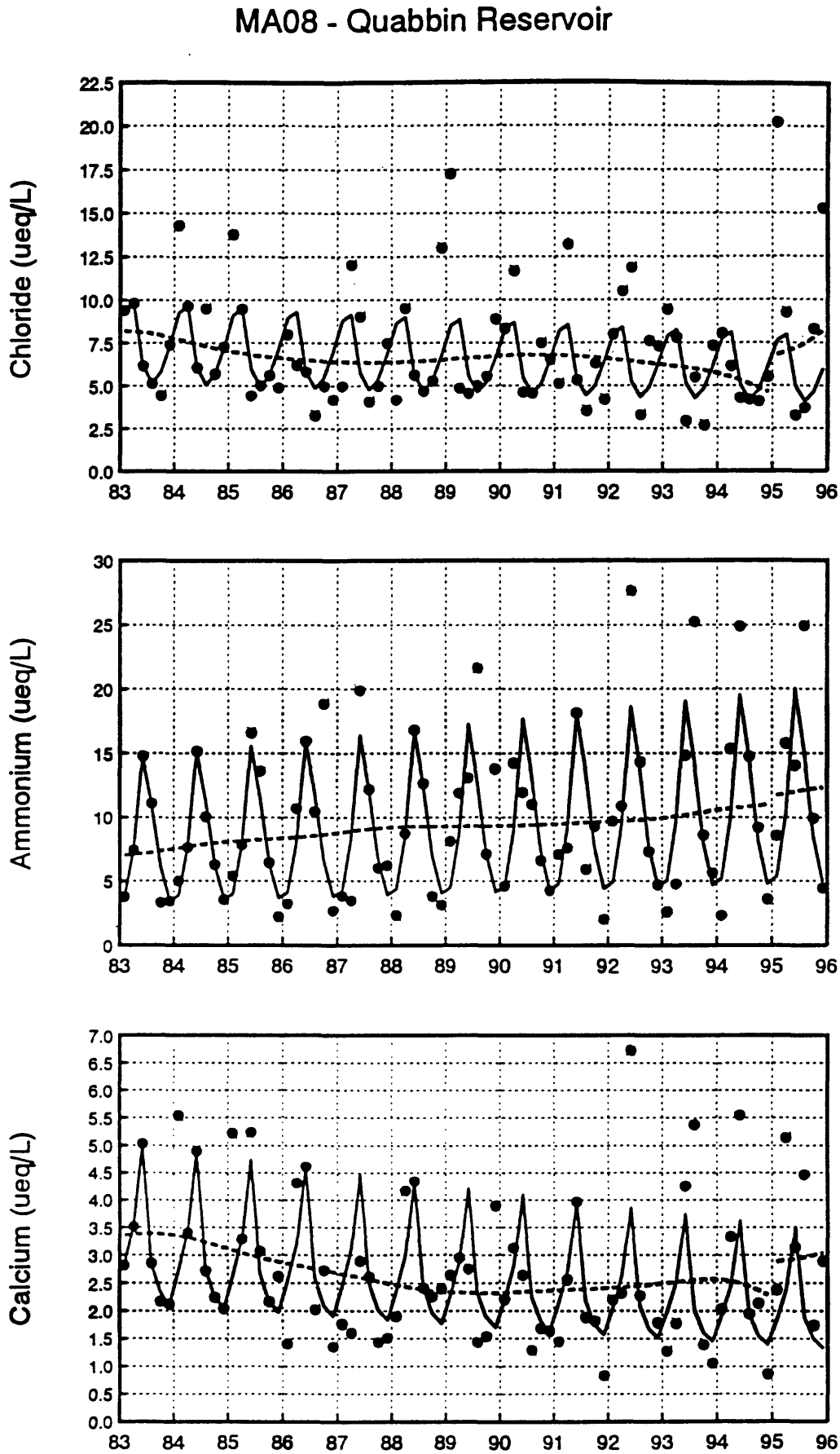


Figure A.11. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Cl^-, NH_4^+ and Ca^{2+} at Quabbin Reservoir, MA.

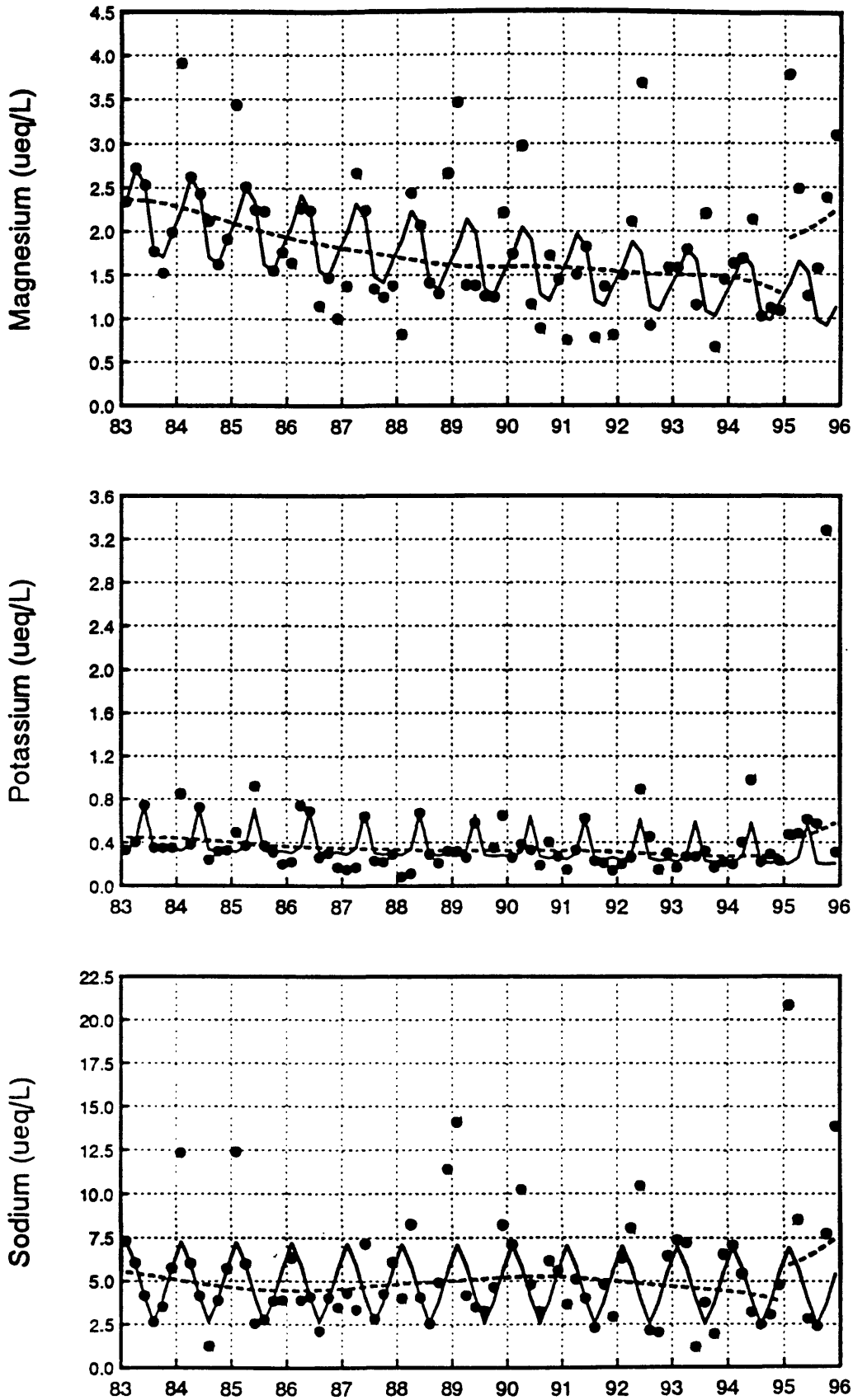


Figure A.12. Linear least-squares trend models (solid line) of observed bi-monthly mean concentrations (solid circles) with LOWESS regression (dashed line) curves for Mg^{2+}, K^{+} and Na^{+} at Quabbin Reservoir, MA.