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Second Progress Report On Chronostratigraphic And Paleoclimatic Studies, Middle Mississippi River Valley, Eastern Arkansas, Western Tennessee, And Northwestern Mississippi

by

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INTRODUCTION
H.W. Markewich

The U.S. Geological Survey (USGS) in Reston Virginia and Denver, Colorado, the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) in Arkansas, Tennessee, and Mississippi, and researchers from the University of Arkansas, and Georgia Southern University are cooperating in lithostratigraphic and the chronostratigraphic studies of Pliocene(?) and Quaternary deposits in the Middle Mississippi River Valley (MMV), that part of the Mississippi River Valley (MRV) between Cape Girardeau, Missouri (near Thebes Gap) and Vicksburg, Mississippi (fig. 1 and 2). These studies have yielded laboratory and field data for loess and Mississippi River alluvium for several localities in northwestern Mississippi, western Tennessee, and eastern Arkansas. Preliminary results from this cooperative effort were published in USGS Open File Report 93-273 (Markewich, 1993). Included were outcrop descriptions and magnetic susceptibility, X-ray diffraction, and age data for localities described and sampled during the first Fiscal Year of the investigations. Open-File Report 93-273 also discusses previous studies of Quaternary deposits in the MMV, the purpose and scope of ongoing investigations, and methods of study and analysis. The reader is referred to that publication for an overview of the objectives and goals of this study. This report includes data for the second year of investigation. It is an update of Open-File Report 93-273.

Localities mentioned in this report on shown on figures 1 and 2. A composite stratigraphic section is shown in figure 3. Stratigraphic names used in this report are those that have been previously assigned by loess stratigraphers who have worked in the area. Reference publications are cited on figure 3. Complete citations are given in the References Cited section. Age and some compositional data are given in the tables. The calculated Be-10 and TL ages are given in Table 1. Plots of the Be-10 inventory values, for selected intervals of loess from the Phillips Bayou and the Yocona River localities, are shown in figure 4. Most data used in figures 5 through 12 are included in Tables 2 and 3. Not all data in Tables 2 and 3 are shown graphically. Table 4 gives the quantification of x-ray diffraction traces for the <0.002 mm fraction of the Peoria Loess on the crest of Crowleys Ridge, topographically above the Phillips Bayou quarry locality (Helena No. 1 core). Traces for some of these intervals are shown in figure 10.

CHRONOSTRATIGRAPHIC DATA

Carbon-14
Meyer Rubin, J.P. McGeehin, and H.W. Markewich

All samples for C-14 analysis were submitted to the U.S. Geological Survey C-14 laboratory in Reston, Virginia. Some samples were analyzed in the Reston laboratory. Others were converted to graphite and submitted to the Lawrence Livermore Center for Atomic Mass Spectrometry. Samples analyzed in Reston are designated by a *W* number. Samples processed in Reston but run at Lawrence Livermore have *WW* process numbers. Lawrence Livermore numbers are designated as *LLCAMS*.

Loess on the highlands.-- Gastropod shells from the basal 2 m of Peoria Loess from the Old River site (35°25'04" N. Lat., 89°58'29" W. Long., Drummonds 1:24,000 quadrangle; fig. 2) have a C-14 age of 21,840±300 yrs B.P. (U.S. Geological Survey C-14 Laboratory, Reston, VA 22092, Lab. No. W-6484), which is in general agreement with the 25 ka age (amino racemization and electron spin resonance) reported by Mirecki and Skinner (1991) for the same interval, and with the 21 ka C-14 age for gastropod shells near the base of the Peoria Loess at Phillips Bayou (fig. 2), reported in Markewich (1993). Gastropod shells in the basal 2 m of Peoria Loess, exposed in an a quarry in northwestern Mississippi (33°51'57" N. Lat., 90°03'25" W. Long., Cascilla, Mississippi 1:24,000 quadrangle), have a composite C-14 age of 19,290±260 (U.S. Geological Survey C-14 Laboratory, Reston, VA 22092, Lab. No. WW-208, LLCAMS-9303), somewhat younger than C-14 ages for gastropods from the same stratigraphic interval at the Phillips Bayou (fig. 3) and Old River localities. No age data are available for the Farmdale paleosol in this area of Mississippi.

Terrace alluvium and silt caps.-- Well preserved, unabraided gastropod shells from a cuttings sample, 11.5 m depth in silt (loess?), from a well near Lexa, Arkansas (34°32'56" N. Lat., 90°50'37" W. Long.; 56.6 m surface altitude) (fig. 2)were submitted for C-14 age determination. The C-14 age for these shells is 25,720±700 yrs B.P (U.S. Geological Survey Radiocarbon Laboratory, Reston, VA 22092, Lab. No. W-6485). An C-14 age determination of 25,870±780 yr (U.S. Geological Survey Radiocarbon Laboratory, Reston, VA 22092, Lab. No. WW-137, LLCAMS - 6321)was obtained for wood from cutting samples at 23-23.5 m depth in the same well. The wood fragments were contained within a sequence of medium to coarse quartz sand with high lithic and iron-aluminosilicate (e.g., hornblende) contents. The similarity of ages for the wood and the shells, that were separated by 13 m of alluvium, suggests that (1) sedimentation was very rapid around 25 ka; and (2) shortly after this period of rapid sedimentation there was a very rapid decrease in discharge and sediment load in this part of the Mississippi River Valley. The Lexa site is located on a late Wisconsinan terrace of Saucier and Snead (1989). The 10-13 m of silt that cover its surface could be the Peoria Loess. If so, then a 25 ka age for the silt is in agreement with the age of the basal Peoria on Crowleys Ridge and the high bluffs east of the present Mississippi River (e.g., Phillips Bayou, Old River, Hornbeak, and Troy localities; fig. 2). The rapid change in discharge and sediment load of the Mississippi River, and (or) larger tributaries, was apparently coincident with the sharp climate change recorded by the Roxana Silt - Peoria Loess contact as exposed on Crowleys Ridge and on the high bluffs east of the present Mississippi River.

A C-14 age was also obtained for wood fragments in well cuttings from a locality near Tillar, Arkansas (33°41'40" N. Lat., 91°29'06" W. Long.; McGeehee North 1:24,000 quadrangle; 47 m surface altitude). The wood was from 11.6 m depth (given in error as 14 m depth in Markewich, 1993, p. 6; error in surface altitude of well) a sand and gravel sequence of predominantly quartz with high iron-aluminosilicate and lithic contents. The C-14 age determination is 3,890±80 (U.S. Geological Survey Radiocarbon Laboratory, Reston, VA 22092, Lab. No. WW-160, LLCAMS-7581). The gravels are from an paleochannel near a former junction of the Arkansas and Mississippi Rivers.

The near 4 ka age for sediments at a depth of 11.6 m near Tillar, Arkansas is in agreement with the 4,600±95 yrs B.P. C-14 age (U.S. Geological Survey Radiocarbon Laboratory, Reston, VA 22092, Lab. No. W-6483) for wood at 11.4 m depth in core from near Turrell, Arkansas in the Wapanocca National Wildlife Refuge (35°21'43" N. Lat., 90°12' 51" W. Long.; Jericho, Arkansas 1:24,000 quadrangle; 68.6 m surface altitude; total depth 43.8 m, base of core still in alluvium) (fig. 2). Two graphitized samples of muck from 9.6 m depth in the same core yielded a ages of 3010±70 and 3030±70 yrs B.P. (U.S. Geological Survey Radiocarbon Laboratory, Reston, VA 22092, Lab. No. WW-143, LLCAMS-6333 and 6332). The 3,000 ka C-14 age indicates that the upper part of the alluvium at this locality is Holocene. A >37 ka C-14 age (U.S. Geological Survey Radiocarbon Laboratory, Reston, VA 22092, Lab. No. W-6479) was obtained for wood at 15.8 m depth in the same core. This >37 ka age suggests either that the greater part of the alluvial sequence is early Wisconsinan or older, or that older sediment and detritus are components of the Holocene alluvium.

Beryllium-10 (Be-10)
M.J. Pavich and H.W. Markewich

Be-10 isotopic analysis has been used as a method of dating loesses in the MMV. Ages estimated from Be-10 inventory data for Phillips Bayou are shown on figure 3 and in Table 1. Because of uncertainty about the concentration of "inherited" Be-10 in the Mississippi River Valley loess, limits of error have not been determined for Be-10 values. However, as calculated, they compare favorably with TL data (discussed in next section). A general summary of chronostratigraphy for the Loveland and younger loesses is as follows. The Loveland Loess corresponds to or correlates with all or part of oxygen isotope stage 6. The Sangamon paleosol developed during all of oxygen isotope stage 5. The Roxana Silt occupies the time interval of stages 4 and 3. The Peoria was deposited during stage 2. (stages based upon Martinson and others, 1987).

Figure 4 compares the Be-10 inventory values for loesses and paleosols exposed at Phillips Bayou with those exposed at the Yocona River locality (sample localities shown on fig. 2). The Be-10 inventory data are in agreement with the pedostratigraphy of both sites (Phillips Bayou description in Markewich, 1993; Yocona River description not yet published). For example, the Roxana Silt at Phillips Bayou is about 6 m thick; at Yocona from 1-1.5 m. The Roxana Silt at the Yocona River locality does not have the two readily identifiable paleosols (the Farmdale and the unnamed basal paleosol) that can be seen at Phillips Bayou. At the Yocona River locality, the Roxana Silt is pedogenically altered throughout. The one paleosol (Farmdale ?) extends from the paleo surface of the Roxana Silt into the underlying Sangamon paleosol that marks the paleo surface of the Loveland Loess . These profile differences are readily expressed in the Be-10 values plotted on parts (a) and (c) of figure 4.

Part (b) of figure 4 shows the Be-10 inventory values for the Pliocene(?) to Pleistocene age alluvial sand and gravel (commonly referred to as the Citronelle(?) and (or) Lafayette(?) Formation), at the Yocona River site. The values suggest that the paleo surface of this unit was subaerially exposed for a period no longer than 150 kyr. If the Be-10 inventory estimate of exposure time is correct, and there is no major pre-paleosol erosion surface, then the alluvial sand and gravel at the Yocona River locality is Pleistocene in age.

Thermoluminescence (TL)
H.T. Millard, Jr. and P.B. Maat, and H.W. Markewich

TL ages have been determined for a three of the four loesses exposed in the Phillips Bayou cut-face (Table 1 and fig. 3). Estimated Be-10 ages are included for comparison. The Be-10 ages are systematically older than TL ages. However, the age differences do not alter the stratigraphic placement of loess units.

A discussion of the methods, assumptions, and interpretation of TL data are to be published in a U.S. Geological Survey Open-File Report, which is in preparation.

PHILLIPS BAYOU
H.W. Markewich, D.A. Wysocki, E.M. Rutledge, and L. B. Ward

A composite stratigraphic profile for the Phillips Bayou section is given in fig. 3. Stratigraphic data (descriptive and compositional) were used to compile the section in fig. 3 are from three sources. Near vertical, 20-30 m high exposures form the back wall of inactive gravel pits located along a 0.8 km stretch of road at the base of Crowleys Ridge near Phillips Bayou, Arkansas. One of these exposures was described and sampled in detail. The description is included in Markewich (1993). Compositional and age data from the exposure are included (Tables 1 and 3, figs. 3-7, 11, 12, and 14). The Helena No. 1 core is a 20 m deep Giddings Rig core from the crest of Crowleys Ridge, upslope and west of the Phillips Bayou quarries. Some mineralogical data for the <0.002 mm fraction of this core are plotted in fig. 10 and shown in Table 4. The Helena No. 2 core is actually several nested cores (4 cores positioned within 0.6 m of each other) located directly upslope from the Phillips Bayou quarry cut-face that was described in Markewich (1993). The deepest individual core was 22 m. The other three were <7 m deep and were obtained in order to have adequate sample for a field description and laboratory analyses of the Holocene surface soil developed in the Peoria Loess. Data are given in Table 2 and on plotted on figs. 4, 8, 9, and 11-13.

Several observations should be made concerning the stratigraphic column shown in fig. 3.

1. The youngest two loesses have been lithostratigraphically and chronostratigraphically correlated with the Peoria Loess and the upper part of the Roxana Silt of Illinois (Wilman and Fry, 1970). As a tentative correlation with the marine isotopic record (Martinson and others, 1987), the Roxana Silt corresponds to oxygen isotope stages 4 and 3, the Peoria Loess to stage 2.

2. The Sangamon paleosol is the paleo surface soil of, and is developed in, the "third " or Loveland Loess (the Loveland Silt of Wilman and Fry, 1970). TL and Be-10 data indicate that the Sangamon paleosol represents all of stage oxygen isotope stage 5 (not just stage 5e), a period of 50-80 k yrs. Pedologic data (horizonization, mineralogy, structure) suggest that the climate during Sangamon time was probably as warm or warmer than present but more monsoonal or drier than present.

3. The basal 3.5 m of Loveland Loess are labeled as Loveland Loess(?) because some descriptive, chemical, mineralogical, and isotopic data suggest that this interval is a separate loess. Another interpretation of the data is that there are one or more unrecognized paleosols in the lower half of the Loveland Loess sequence. Preliminary TL data suggest an age of about 190 ka for the basal few meters of Loveland Loess .

4. What is presently called the "Fourth" loess is tentatively correlated with the Crowleys Ridge Loess of Porter and Bishop (1990) and is labeled Crowleys Ridge Loess(?) on fig. 3 (Crowleys Ridge Silt in Markewich, 1993). No age data are presently available for this unit. The boundary between the Crowleys Ridge Loess and the Loveland Loess at Phillips Bayou is tentatively placed at 1386 cm below the top of the Farmdale paleosol at the Roxana Silt - Peoria Loess contact. Age and soil micromorphological data, which should be available in 1994, may result in a repositioning of the Crowleys Ridge Loess - Loveland Loess contact.

Discussion of the palynological composition of the Farmdale paleosol is given in the *Palynological Data* section of this report.

Mineralogy

S.G. VanValkenburg, H.W. Markewich, and D.A. Wysocki

A general discussion of the clay mineralogy of MMV loesses older than the Peoria Loess was included in Markewich (1993). X-ray diffraction data for the clay size fraction (<0.002 mm) for selected intervals of Peoria Loess in the Helena No. 1 core at Phillips Bayou are given in Table 4. Some traces are shown on figure 10. This core is from the crest of Crowleys Ridge, topographically upslope from Phillips Bayou quarry cut-face. We interpret the core as being entirely Peoria Loess. An expandable smectitic clay (between 17.2 and 18.0 A) and illite (about 10 A) are the main constituents. Quartz is present as a minor constituent in every sample. Dolomite and plagioclase feldspar are common at depths >5 m. Mineralogy of the <0.002 mm size fraction of the Helena No. 1 core compliments the mineralogy of the coarse silt fraction of the Helena No. 2 core shown in figure 9 (see also Table 2).

X-ray data indicate that there is no calcite present in either the coarse silt fraction or the clay fraction of any loess. Optically identifiable carbonate (dolomite) is restricted to the Peoria

Loess. Although quartz is a minor constituent of the <0.002 mm size fraction of every loess (fig. 10, Tables 2 and 3 and Markewich, 1993), it is the primary component of the 0.02-0.05 mm size fraction (figs. 7 and 9; Tables 2 and 3). Potassium feldspar is the second most abundant mineral in the coarse silt fraction of the loess. Plagioclase feldspar is most common in the Peoria Loess. This agrees with the descriptive data from Phillips Bayou that the older loesses appear to have either been leached as deposited (indicative of a slow deposition rate in a wet environment) or chemically and mineralogically altered due to long term subaerial exposure.

The data, as presented, do not show the percent of other weatherables (grains too altered to be identified) substantially increasing at stratigraphic boundaries or in pedogenically altered parts of the loess section. The high content of other weatherables throughout the section suggests that these highly weathered grains were deposited as part of the primary loess sequence. Further data reduction is necessary in order to determine what percent of these grains represent post depositional alteration.

Chemistry
E.M. Rutledge, H.W. Markewich, and D.A. Wysocki

Figures 11-14 are plots of chemical data from the Helena No. 2 core and the Phillips Bayou quarry cut-face. The data are plotted against depth of core or distance from the top of the Farmdale paleosol at the paleo-surface of the Roxana Silt (the Roxana Silt - Peoria Loess contact), which we used as a datum in describing the quarry cut-face at Phillips Bayou and the gully headwall at the Old River locality.

Generally, major stratigraphic breaks and interglacial paleosols are reflected in the chemistry of the sediments. However, none of the loesses appear to have a unique chemical signature. The one exception may be the Peoria Loess which is high in extractable Na (fig. 13). The reasons for the high Na values are thought to be from the weathering of plagioclase and other Na-rich feldspars in the Peoria Loess (Wilding and others (1963). The reasons for Na accumulation are not understood. Wilding and others (1963) suggested local hydrological conditions controlled accumulation in areas where the Peoria Loess is underlain by till. No data are available for suggesting controls on Na accumulation in soils of the unglaciated MMV. In the MMV, the Peoria Loess is commonly 5-15 m thick and underlain by loess or sandy alluvium.

Palynological Data
F.J. Rich

Sediment from the Farmdale paleosol exposed in the Phillips Bayou quarry cut-face was prepared for palynological analysis. The sample consisted of a large quantity of moist, homogeneous, grayish brown (5YR 3/2) to moderate brown (5YR 3/4) silt. It was identified as Phillips Bayou 2A4, 62-85 cm dated at 28,980±800 yrs B.P. (Markewich, 1993). The sample was processed for pollen/spores by first mixing a few grams with 10% HCl to remove carbonates. After it was washed once with distilled water the residue was covered with HF. A vigorous reaction followed, during which most of the silicates were destroyed. After remaining in the HF for several days the residue was washed free of acid, then mixed with glycerin jelly and water. Only two slides were prepared for preliminary optical analysis, each with an area of 22x22 mm. One slide was scanned entirely while the other was studied in less detail.

The insoluble organic residue consisted of dark, angular particles, many of which were on the order of 0.002-0.005 mm across. There was a great deal of HF-insoluble mineral matter, most notably prismatic crystals of a of a mineral with a high refractive index and brilliant birefringence; these appeared to be zircon. Pollen/spores were extremely rare, with only three grains on the slide that was observed in detail. One was a grass, one was a composite, and the third was a rather well preserved cyst of the algae(?) *Pseudoschizea rufina.*

Almost nothing can be said about such an "assemblage" except that the cyst is of some interest. It is generally associated with freshwater marsh deposits.

The general lack of palynomorphs is actually more interesting that their presence in this sample. The color of the sediment, the area of its origin, and the fact that it is a silt all suggest that it would have abundant pollen/spores. Had the aerodynamic, hydrodynamic, and phytological aspects of the environment permitted, pollen and spores should have accumulated. Either plants did not grow where this silt was deposited, or their pollen and spores simply could not accumulate because they were either blown or carried away. Alternatively, it may be possible that at this locality the silt accumulated so rapidly that the pollen and spores were heavily diluted. The age data from Phillips Bayou do not support this last alternative but a local phenomenon should not be ruled out.

More work is necessary before any evaluation can be made of this units palynological characteristics.

OLD RIVER SECTION

H.W. Markewich and D.A. Wysocki

The stratigraphy of the loess section at the Old River locality is similar to the stratigraphy at the Phillips Bayou locality, but there are some differences. The section is thinner, although the Peoria Loess thickness is probably comparable. The Sangamon paleosol at the Old River locality lacks the Mn concretions present at Phillips Bayou. Small pockets of the basal 1m of Roxana Silt at the Old River site include small irregularly shaped carbonate concretions and "ghost" gastropod shells; whereas no shell material or concretions were observed in the Roxana at the Phillips Bayou locality. Another difference is that the sand at the base of the Crowleys Ridge Loess(?) at the Phillips Bayou locality is not present at the Old River locality.

The following is a detailed description of the loess section described at the Old River locality, third Chickasaw Bluff (35°25'04" N. Lat., 89°58'29" W. Long., Drummonds 1:24,000 quadrangle). This location of this site was incorrectly given as 34°38'12' N. Lat., and 90°38'05"W. Long. in Markewich (1993). The error came from discrepancies in road locations on the 1:100,000 and the 1:24,000 topographic quadrangles. The sampled exposure is in high, nearly vertical, bluffs at the head of an active gully, directly across the road from the gate at the Lucado Ranch, on the east side of the Mississippi River in Tipton County, Tennessee.

A general description of this site was included in the Field Trip Guide for the 1975 meetings of the Southeastern Section of the Geological Society of America (Parks and Lounsbury, 1975). The same four loesses seen at Phillips Bayou are exposed here. From oldest to youngest they are the Crowleys Ridge Loess(?), the Loveland Loess, the Roxana Silt, and the Peoria Loess. The paleosol at the surface of the Roxana Silt has been correlated to the Farmdale paleosol of Illinois based upon stratigraphic position and age (C-14 data given in following description and in Markewich, 1993).

DESCRIPTION OF OLD RIVER LOESS SECTION

Location: 35°25'04" N. Lat., 89°58'29" W. Long., Drummonds 1:24,000 quadrangle, Tipton County, Tennessee

Date Described: October 20-22, 1992

Description By: ***D.A. Wysocki, E. Lewis, J. Jenkins, and L.B. Ward*** of USDA, Soil Conservation Service

Notes: Horizon nomenclature and texture subject to revision. The top nine meters of Peoria Loess could not be described or sampled; the vertical wall was accessible only by rope. Beginning depth (900 cm) measured by tape from top of exposure.

Peoria Loess

Note: As reported in the section on C-14 ages, a 21 ka C-14 age and a 25 ka amino racemization/electron spin resonance age have been determined from gastropod shells in the basal 2 m of the Peoria Loess at this locality.

C1 – 900 to 950 cm; very pale brown (10YR 7/3) silt; few, moderate and coarse, prominent, strong brown (7.5YR 5/6) mottles; massive; few, small (< 5 mm), manganese masses; few, very fine and fine pores; no roots; few joints which occur diagonally across face; slightly effervescent with 1N HCl; occasional gastropod shell; occasional, round, hard, calcium carbonate/silica concretions up to 2 cm.

C2 – 950 to 1000 cm; pale brown (10YR 6/3) silt; common, small (1-2 cm), round pockets of dark grayish brown (10YR 4/2) silt from horizon below; few, fine, medium and coarse, prominent, strong brown (10YR 5/6) mottles; massive; joints of large prisms cut diagonally across face of exposure; thin, discontinuous, prominent, black (10YR 2/1) mangans on joint faces; few, very fine and fine pores; slightly effervescent with 1 N HCl. A thin (1-2 cm), strong brown (7.5YR 5/6) band occurs directly above contact of Roxana Silt; clear, smooth boundary.

Roxana Silt

2A1b – 1000 to 1021 cm; dark grayish brown (10YR 4/2) silt; common, small (1-2 cm), round pockets of pale brown (10YR 6/3) silt from overlying Peoria; massive in place; friable in hand; noticeable joint on pit face; dark brown (7.5YR 4\4) clay along surface of joint; very few, fine and medium, pores; some pores coated with dark red (2.5YR 3/6) ferrans; matrix gives no reaction with acid; one, small gastropod shell observed; clear, smooth boundary.

Note: A 26,490± 270 yrs B.P. C-14 age for the top of the Farmdale paleosol at the Old River site was reported in Markewich (1993). These ages are in good agreement with those for the same loess units at the Phillips Bayou locality (fig. 3).

2A2b – 1021 to -1040 cm; dark brown (10YR 3/3) silt; few, small (1-2 cm), round pockets of pale brown (10YR 6/3) silt from Peoria; massive in place; friable in hand; noticeable joint continues through this horizon; few, fine and medium, pores; some pores coated with dark red (2.5YR 3/6) ferrans; occasional, calcium carbonate/silica concretions; few, fine, soft iron masses; clear, smooth boundary.

2Bw1b -- 1040 to 1078 cm; dark brown (10YR 4/3) silt; few, small (1-2 cm), round pockets of pale brown (10YR 6/3) silt from Peoria; weak, coarse, prismatic structure; horizon is massive at some locations; common, fine and few, medium and coarse pores; most pores coated with dark red (2.5YR 3/6) ferrans; walls of some pores are oxidized; cutans cover ferrans on some pores; few, fine, soft iron masses; occasional, irregular, calcium carbonate/silica concretions; clear, smooth boundary.

2Bw2b -- 1078 to 1130 cm; brown (10YR 5/3) silt; few, small (1-2 cm), round pockets of dark grayish brown (10YR 4/2) silt from Peoria; common, fine prominent red (2.5YR 4/6) mottles; weak, coarse, prismatic structure; few, faint, discontinuous, grayish brown (10YR 5/2) silt coats on vertical surfaces of prisms; common, fine and few, medium and coarse pores; most pores coated with dark red (2.5YR 3/6) ferrans; some pores contain cutans which cover ferrans; few, small (1-2 cm), soft, iron masses; few, small (1-2 cm), soft, manganese masses; gradual smooth boundary.
Subsampled: 1078-1104 cm; 1104-1130 cm.

2C1b -- 1130 to 1177 cm; dark brown (7.5YR 4/4) silt; weak, very coarse (up to 1 m wide and several meters along vertical dimension), prismatic structure, massive between prisms; friable in hand; pockets from Peoria no longer evident at base of horizon some in upper part of horizon; few, fine and very fine pores; most pores are coated by thick (1-3 mm) yellowish red (5YR 5/6) ferrans; very pale brown (10YR 7/2) clean silt grains on vertical faces of joints and on faces of prisms observable under 10X lens when dry; matrix has no reaction with HCl; occasional, hard, small (1-2 cm), round calcium carbonate/silica concretion; gradual, wavy boundary.

2C2b -- 1177 to 1231 cm; dark brown (7.5YR 4/4) silt; few, medium and coarse, strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; very coarse (up to 1 m wide and several meters along vertical dimension) prismatic structure, massive between prisms; friable in hand; very few, fine and common, fine pores; most pores coated by thick (1-2 mm) dark red (2.5YR 3/6) ferrans; Some pores have black (10YR 2/1) mangans which coat the ferrans; common, thin, discontinuous, dark brown (7.5YR 4/4) and yellowish brown (10YR 5/4) cutans on faces of prisms; occasional small (<2 cm), soft manganese masses; occasional small (<2 cm), soft iron masses; matrix gives no reaction with HCl; occasional, small (1-2 cm) calcium carbonate concretion/silica; gradual, smooth boundary.

Loveland Loess

3Bt1b -- 1231 to 1243 cm; yellowish red (5YR 4/6) silty clay loam; common, fine, faint yellowish red (5YR 5/6) mottles; moderate, medium, subangular blocky structure; firm; many, thick, continuous, prominent dark reddish brown (2.5YR 3/4) cutans on surfaces of peds; many (50% of surfaces), discontinuous, pale brown (10YR 6/3) coats of clean silt (skeletans) atop cutans on faces of peds; few, fine and medium pores; occasional, small (1-4 cm) calcium carbonate/silica concretion; clear, smooth boundary.

3Bt2b -- 1243 to 1267 cm; yellowish red (5YR 4/6) clay; strong, very coarse and coarse, subangular blocky structure which parts to moderate, medium, subangular blocky structure; firm; many, thick, continuous, prominent, dark red (2.5YR 3/6) cutans on surfaces of peds; many (25% of surfaces), discontinuous, pale brown (10YR 6/3) coats of clean silt (skeletans) atop cutans on faces of peds which fade with drying; few, fine, discontinuous, tubular pores; most pores coated with dark red (2.5YR 3/6) cutans; gradual, smooth boundary.

3Bt3b -- 1267 to 1294 cm; yellowish red (5YR 4/6) clay (field estimate 45% clay); weak, coarse, prismatic structure which parts to moderate or strong, medium, angular blocky structure; firm; many, thick, continuous, prominent, dark red (2.5YR 3/6) cutans on surfaces of peds, horizon of maximum cutan development; common (15% of surfaces), discontinuous, pale brown (10YR 6/3) coats of clean silt grains (skeletans) atop cutans on faces of peds which fade with drying; few, fine, discontinuous, tubular pores; most pores coated with dark red (2.5YR 3/6) cutans; gradual, smooth boundary.

3Bt4b -- 1294 to 1321 cm; yellowish red (5YR 4/6) clay (field estimate 35-40% clay); many (30%), medium and coarse, prominent, brownish yellow (10YR 6/6) mottles; weak, coarse, prismatic structure; firm; many, thick, continuous, prominent, dark red (2.5YR 3/6), and few, thin, discontinuous, pale brown (10YR 6/3) cutans on surfaces of peds; few, fine, tubular pores; most pores coated with dark red (2.5YR 3/6) cutans; occasional, small (1-2 cm) hard, round calcium carbonate/silica concretions gradual, smooth boundary.

3Bt5b – 1321 to 1352 cm; reddish brown (10YR 5/6) silt loam or silty clay loam (field estimate 25% clay); common, medium, distinct, pale brown (10YR 6/3) mottles; weak, medium and coarse, subangular blocky structure; firm; common, thin, discontinuous, yellowish red (5YR 4/6) cutans on surfaces of peds; few, fine and medium pores; most pores coated by cutans of same color as surfaces of peds; occasional, small (1-2 cm), hard, round calcium carbonate/silica concretion; clear irregular boundary.

3BCtb – 1352 to 1389 cm; reddish brown (10YR 5/6) silt loam (field estimate 15% clay); few, fine, distinct, pale brown (10YR 6/3) mottles; weak, medium and coarse, subangular blocky structure; friable; common, thin, discontinuous, yellowish red (5YR 4/6 and 5/6) cutans on surfaces of peds; few, fine pores; most pores coated by cutans of same color as surfaces of peds; occasional, small (1-2 cm), hard, round calcium carbonate/silica concretion; slight brittleness noted in parts of horizon; gradual, smooth boundary.

3Ctb – 1389 to 1429 cm; mottled strong brown (7.5YR 5/8) and pinkish gray (7.5YR 6/2) silt loam (field estimate 19% clay); weak, very coarse, prismatic structure; massive between prisms; friable in hand; common, thin, discontinuous, strong brown (7.5YR 4/6) cutans on surfaces of prisms; common, fine pores; some pores coated by cutans of same color as surfaces of prisms; common, small (<1 cm), black (10YR 2/1) manganese masses adjacent to grayish mottles; common, patchy, pale brown (10YR 6/3) skeletans on some faces of prisms; clear, smooth boundary.

Crowleys Ridge Loess(?)

4C1b -- 1429 to 1457 cm; dark brown (7.5YR 4/4) silt loam (field estimate 12-15% clay); common, fine and medium, distinct, reddish gray (5YR 5/2) mottles; massive; friable in hand; occasional prism extending from above horizon; thin, discontinuous, strong brown (7.5YR 4/6) cutans on surfaces of prisms; few, very fine and fine pores; abrupt change in pore distribution from above horizon; few, small (1-2 cm), black (10YR 2/1) manganese masses; brittleness noted in parts of horizon; gradual, smooth boundary.

4C2b -- 1457 to 1482 cm; strong brown (7.5YR 5/6) silt loam (field estimate 12-15% clay); fine, distinct, reddish gray (5YR 5/2) mottles; massive; friable in hand; occasional prism extending from above horizon; thin, patchy, strong brown (7.5YR 4/6) cutans on surfaces of prisms; few, very fine and fine pores; few, small (1-2 cm), black (10YR 2/1) manganese masses; brittleness noted in parts of horizon; diffuse, smooth boundary.

4C3b -- 1482 to 1538 cm; strong brown (7.5YR 4/6) silt loam or loam (field estimate 12-15% clay); sand content increases with depth in horizon; common, distinct, reddish gray (5YR 5/2) mottles which occur as "halos" around rhizospheres; massive; friable in hand; occasional prism; few, fine pores; few, small (1-2 cm), black (10YR 2/1) manganese masses; brittleness noted in parts of horizon; gradual, smooth boundary.

Subsampled: 1482-1510 cm; 1510-1538 cm.

4C4b – 1538 to 1564 cm; strong brown (7.5YR 5/6) sandy loam (field estimate 12-15% clay); sand content increases with depth in horizon; massive; very friable in hand; occasional prism (1 m or larger); few, fine and medium pores; occasional pore coated by yellowish red (5YR 4/6) cutans; few, small (1-2 cm), black (10YR 2/1) manganese masses; this horizon may have been E for underlying paleosol; clear, smooth boundary.

Unnamed alluvium

5EBtb -- 1565 to 1580 cm; mottled strong brown (7.5YR 4/6) and yellowish brown (10YR 5/6) sandy loam; massive; very friable; occasional prism (1 m or larger); common, fine, and few, medium pores; most pores coated by yellowish red (5YR 4/6) cutans; few, small (1-2 cm) black (10YR 2/1 manganese masses; clear, smooth boundary.

5Bt1b -- 1580 to 1604 cm; yellowish red (10YR 4/6) sandy clay loam or sandy clay; common, medium, distinct yellowish brown (10YR 5/6) common, fine, distinct, brownish yellow (10YR 6/6) and few, fine, prominent, red (2.5YR 4/6) mottles; weak, medium to very coarse, subangular blocky structure; friable; occasional prism (1 m or larger); few, medium and coarse pores; most pores coated by yellowish red (5YR 4/6) cutans; few, small (1-2 cm) black (10YR 2/1) manganese masses; clear, smooth boundary.

5Bt2b -- 1604 to 1625 cm; yellowish brown (10YR 5/6) sandy clay or clay loam; many coarse, prominent, red (2.5YR 4/6) mottles; common, medium, prominent, dark yellowish brown (10YR 4/6) reticulate, iron nodules which is near the stage of plinthite; weak, medium to very coarse subangular blocky structure; firm; occasional prism (1 m or larger); thin, discontinuous, yellowish red (5YR 4/6) and pale brown (10YR 6/3) cutans on surfaces of peds; few, fine pores; some pores coated by thick (0.5-1 cm), yellowish red (5YR 4/6) cutans; some pores coated by thin (1-2 mm) black (10YR 2/1) mangans; clear, wavy boundary.

5Bt3b -- 1625 to 1689 cm; mottled brownish yellow (10YR 6/6), light brownish yellow (10YR 6/2), strong brown (7.5YR 5/8 and 5/6), and red (10 4/6) sandy clay loam with pockets of sandy clay; weak, very coarse, subangular blocky structure; firm; occasional prism (1 m or larger); thin, discontinuous, yellowish red (5YR 4/6) cutans on surfaces of peds; few, fine pores; some pores coated by thin, yellowish red (5YR 4/6) cutans; clear, wavy boundary (trough = 42 cm, wavelength = 1m).
Subsampled: 1625-1657 cm; 1657-1689 cm.

5BCtb -- 1689 to 1752 cm; mottled yellowish brown (10YR 5/6), brownish yellow (10YR 6/8), and light gray (10YR 7/2) sandy loam with pockets of sandy clay loam; weak, very coarse, subangular blocky structure; friable; few, fine pores; few, rounded chert pebbles; clear, smooth boundary
Subsampled: 1689-1721 cm; 1721-1752 cm.

5C1b -- 1752 to 1792 cm; strong brown (7.5YR 5/6) stratified sandy loam with gravel beds 4-10 cm thick which includes bands of ironstone up to 1 cm thick, common, medium and coarse, distinct, brownish yellow (10YR 6/8) and light gray (10YR 7/2) mottles; massive; very friable in hand; common, fine and few, medium pores; most pores coated by thin yellowish red (5YR 4/6) cutans; abrupt, smooth boundary.

Pliocene(?) and or Pleistocene sand and gravel (locally referred to as the Citronelle and (or) Lafayette Formation)

6C2b -- 1792 to 1853 cm; stratified with alternating layers of yellowish red (7.5YR 6/6), light gray (10YR 7/2) and light brownish gray (2.5Y 6/2) loamy fine sand; strata vary slightly in particle size; single grained; loose; top of horizon capped 1-2 cm band of ironstone.
Subsampled: 1792-1821 cm; 1821-1853 cm

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Table 1. TL and Be-10 inventory ages
for selected depths in the Phillips Bayou loess section.
Samples taken from quarry cut-face.

Distance from top of Farmdale paleosol	Field No. TL sample	TLTB (Total Bleach) age 10^3 yr	TLTB error bar 10^3 yr	TLPB (Partial Bleach) age 10^3 yr	TLPB error bar 10^3 yr	TLWA (weighted average) age 10^3 yr	TLWA error bar 10^3 yr	Calculated Be-10 age 10^3 yr
+90 cm	MMV-18	26.3	2.3	20.5	3.6	24.7	1.9	
-220 cm	MMV-19	31.3	2.6	38.8	3.8	33.7	2.1	44
-473 cm	MMV-20	43.7	3.9	50.1	5	46.1	3	60
-723 cm	MMV-21	121	16	123	27	122	14	124
-1386 cm	MMV-22	193.7	39.7	173.6	43.0	189	3	183

*/ In the Middle Mississippi River Valley, the Farmdale paleosol marks the paleo-surface of the Roxana Silt and has a C-14 age between 26 and 29 Ka (Markewich, 1993; this report).

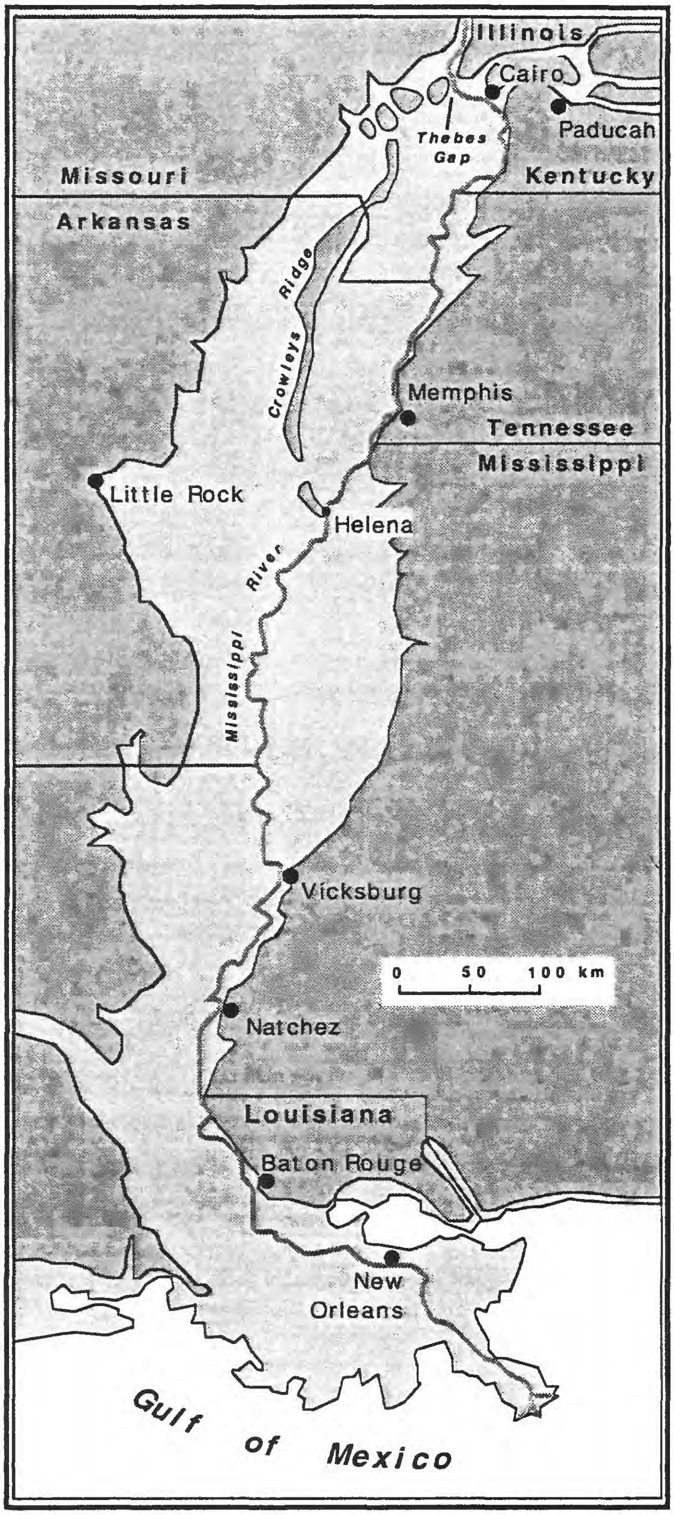


Fig. 1. Generalized location map - Lower Mississippi River Valley. The Quaternary alluvial valley is shown in light gray. Uplands are dark gray. Areas of loess are not shown.

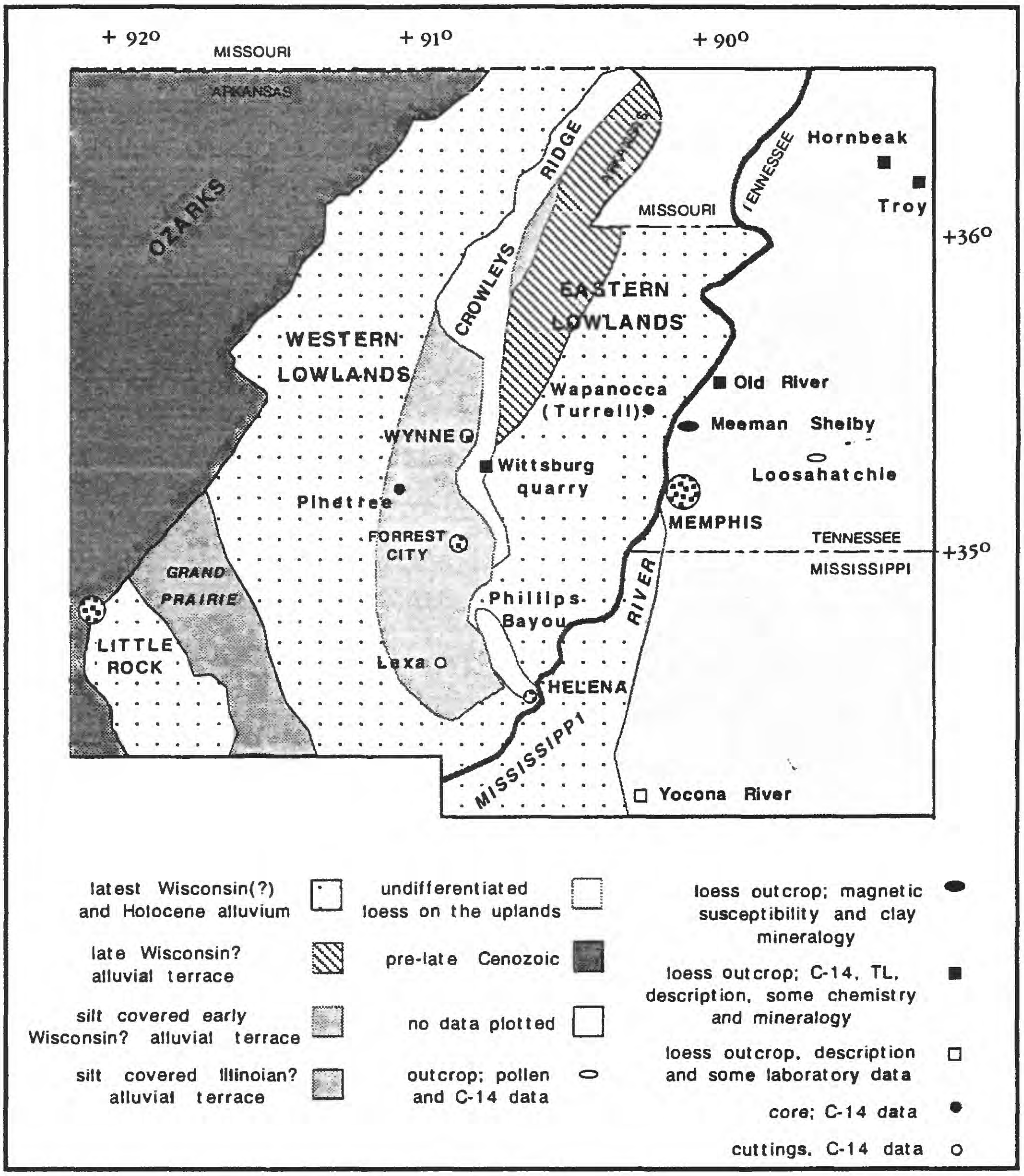
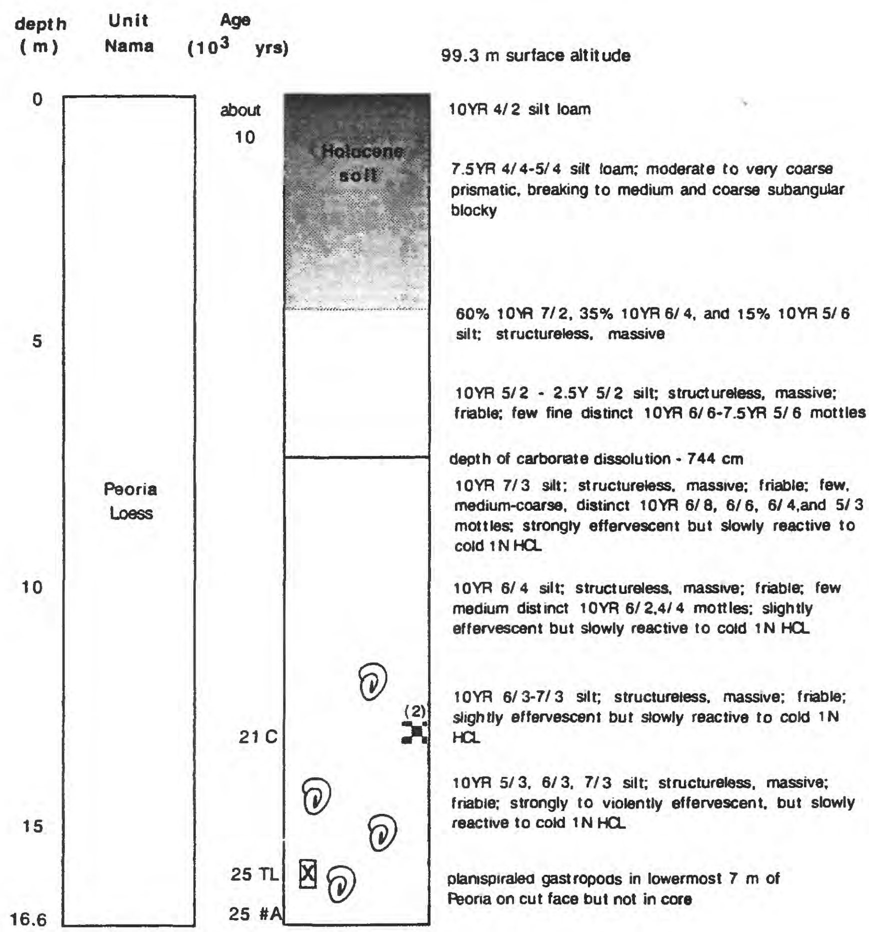


Figure 2. Generalized location map showing the study area in Mississippi, Tennessee, and Arkansas. Geology based on Saucier and Snead (1989), Guicionne and Rutledge (1990), this study, and current investigations of the SCS, Little Rock (L.B. Ward, unpublished field notes, 1990-1994). Not shown are locations of sites in Missouri, Arkansas, and Mississippi that are scheduled to be sampled in 1994 and 1995.



depth (m)
Unit Nama
Age (10^3 yrs)
99.3 m surface altitude
0
5
10
15
16.6
Peoria Loess
about 10
21 C
25 TL
25 #A
(2)
Holocene soil
10YR 4/2 silt loam
7.5YR 4/4-5/4 silt loam; moderate to very coarse prismatic, breaking to medium and coarse subangular blocky
60% 10YR 7/2, 35% 10YR 6/4, and 15% 10YR 5/6 silt; structureless, massive
10YR 5/2 - 2.5Y 5/2 silt; structureless, massive; friable; few fine distinct 10YR 6/6-7.5YR 5/6 mottles
depth of carbonate dissolution - 744 cm
10YR 7/3 silt; structureless, massive; friable; few, medium-coarse, distinct 10YR 6/8, 6/6, 6/4,and 5/3 mottles; strongly effervescent but slowly reactive to cold 1N HCL
10YR 6/4 silt; structureless, massive; friable; few medium distinct 10YR 6/2,4/4 mottles; slightly effervescent but slowly reactive to cold 1N HCL
10YR 6/3-7/3 silt; structureless, massive; friable; slightly effervescent but slowly reactive to cold 1N HCL
10YR 5/3, 6/3, 7/3 silt; structureless, massive; friable; strongly to violently effervescent, but slowly reactive to cold 1N HCL
planispiraled gastropods in lowermost 7 m of Peoria on cut face but not in core

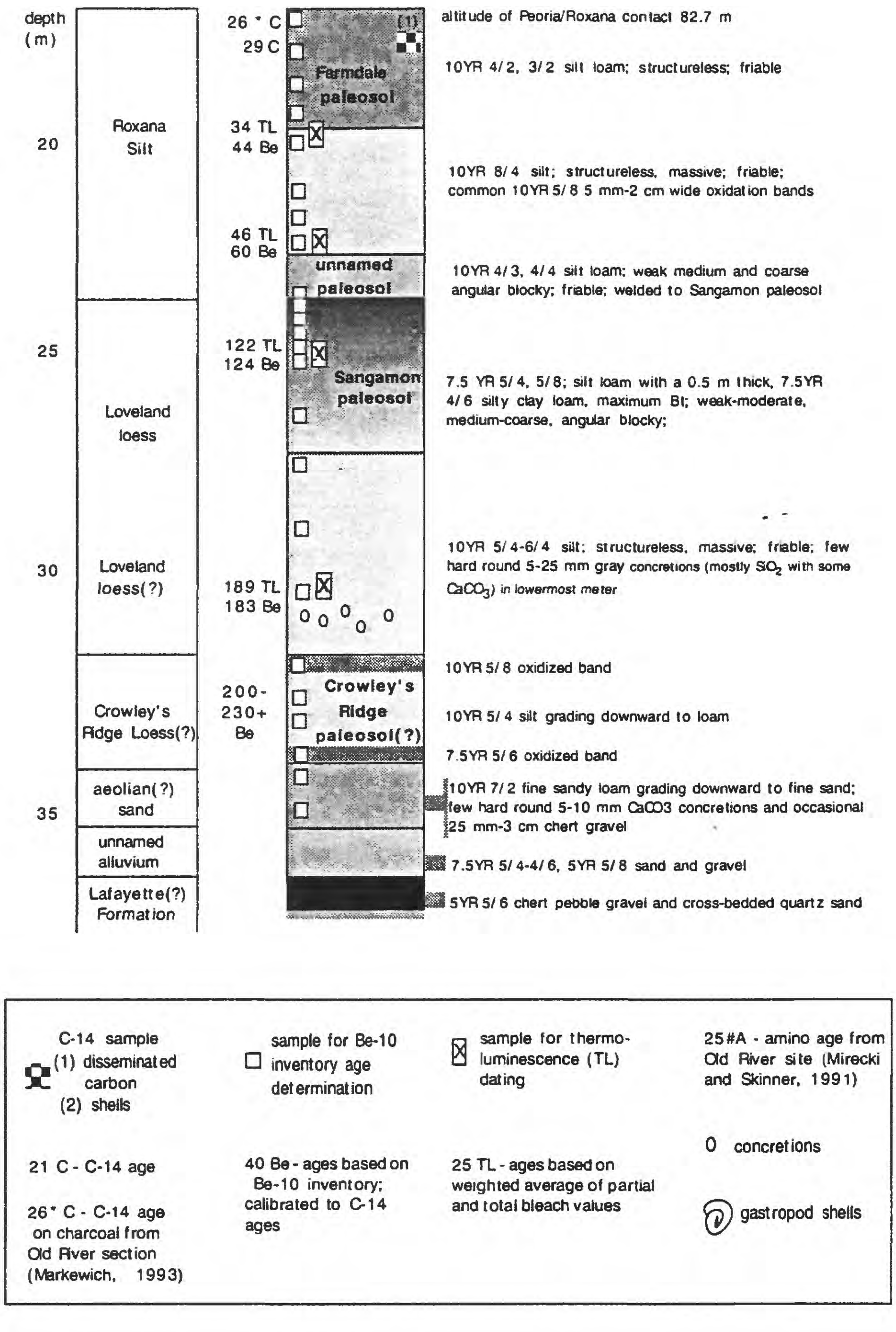


Figure 3. Composite stratigraphic column for loess and alluvial sequence underlying the southern end of Crowleys Ridge near Phillips Bayou, Arkansas. Descriptions are from the Helena No. 2 core and the Phillips Bayou quarry cut-face. Geologic and pedologic unit names are from published litherature: Peoria Loess and Roxana Silt (Wilman and Fry, 1970); Loveland loess (Daniels and Handy,1959), Crowley's Ridge Loess (Porter and Bishop, 1990). Compositional data are given in Tables 2 and 3. Age data are given in the text and in Table 1.

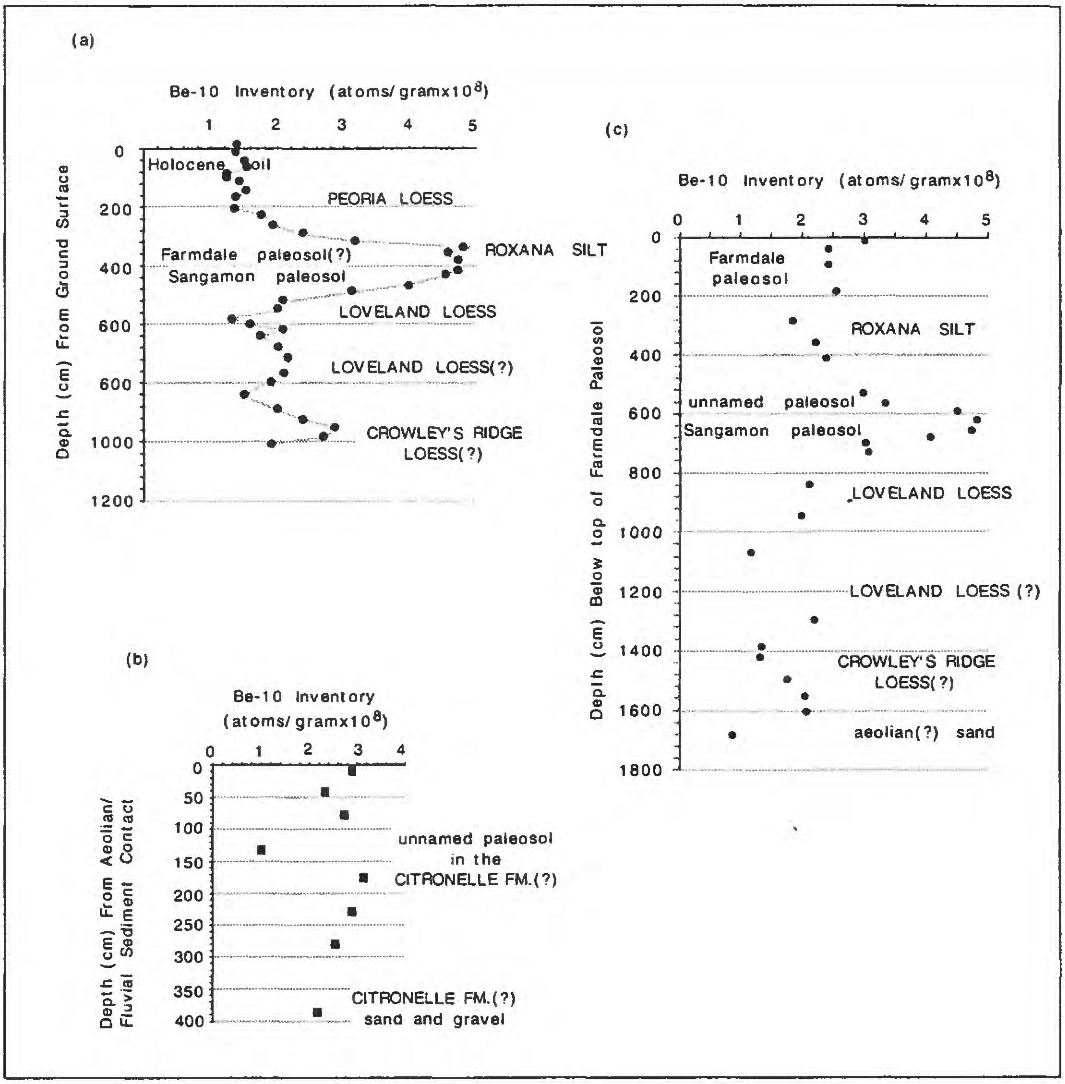


Figure 4. Be-10 inventory data for selected horizons. (a) loess, Yocona River site. (b) Citronelle(?) sand and gravel, Yocona River site. (c) loess and aeolian(?) sand, Phillips Bayou quarry cut-face. Because data are for selected horizons, the points are not connected, except in (a). Data points in (a) are connected only to clarify relative positions, not to indicate that intervening points would necessarily lie on the curve. Stratigraphic boundaries are not shown, but general stratigraphic position is indicated by unit and (or) paleosol name.

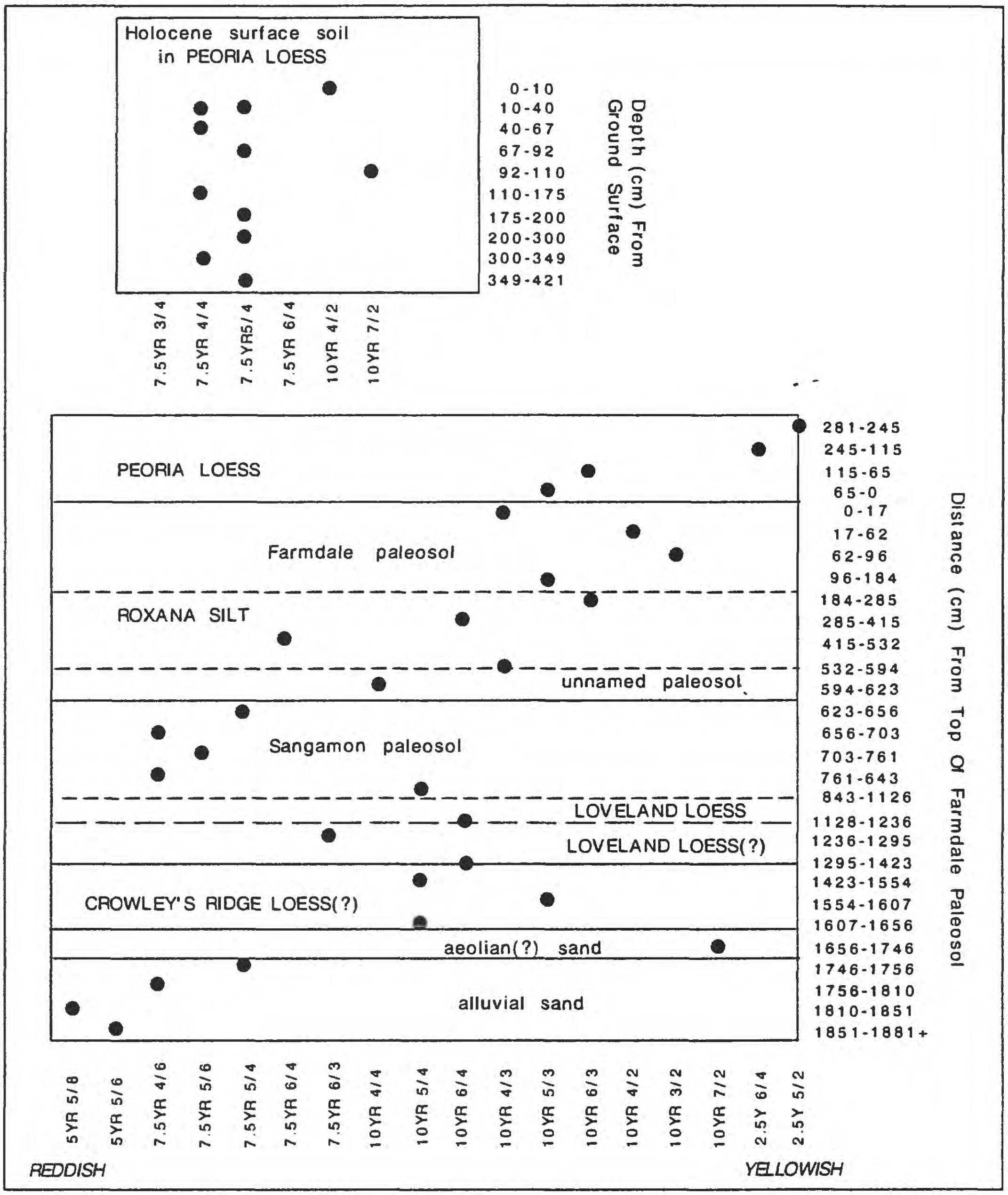


Figure 5. Plot of color vs. depth for the Holocene surface soil developed in Peoria Loess (Helena No. 2 core) and for aeolian and alluvial deposits exposed in the Phillips Bayou quarry cut-face.

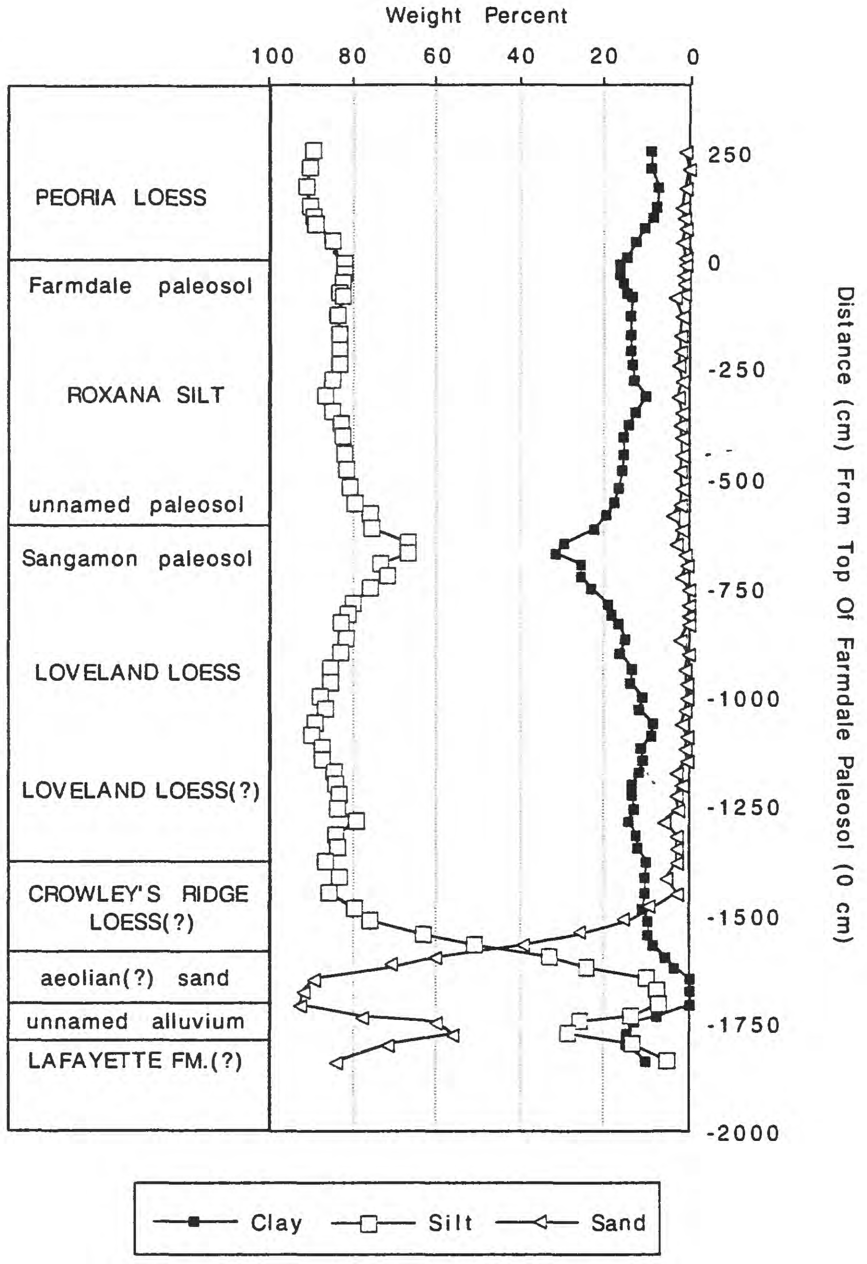


Figure 6. Weight percent sand, silt, and clay vs. depth for Phillips Bayou quarry cut-face . Dashed line shows contact between calcareous and noncalcareous loess at top of the Farmdale paleosol.

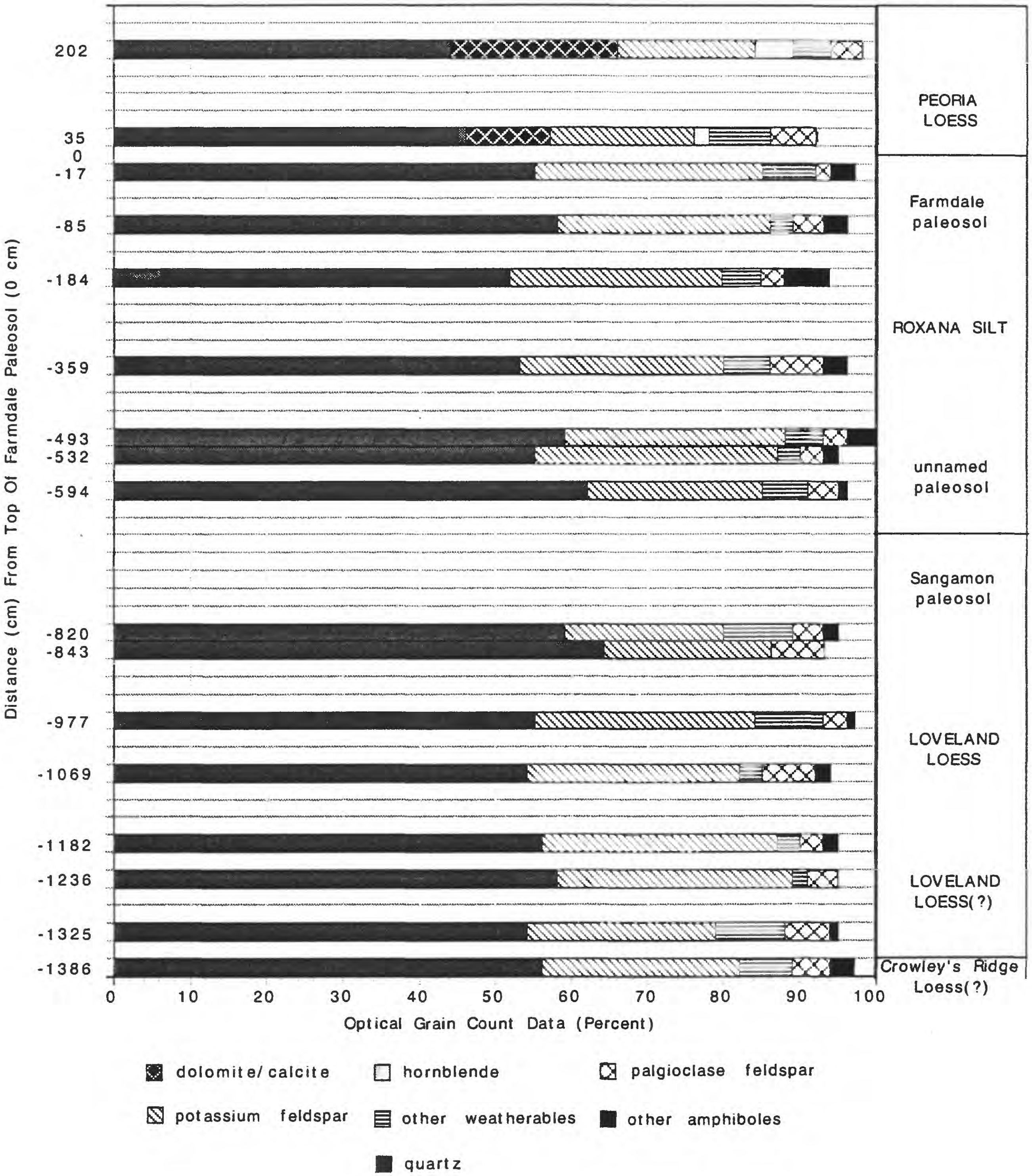


Figure 7. Coarse silt (0.02-0.05 mm) mineralogy of loesses exposed in the Phillips Bayou quarry cut-face. X-ray diffraction data for the coarse silt fraction indicate that all carbonate minerals are dolomite. The category "other amphiboles" includes all amphiboles and pyroxenes for which the specific mineral could not be positively identified. The category "other weatherables" includes all grains that have been weathered (altered) beyond recognition.

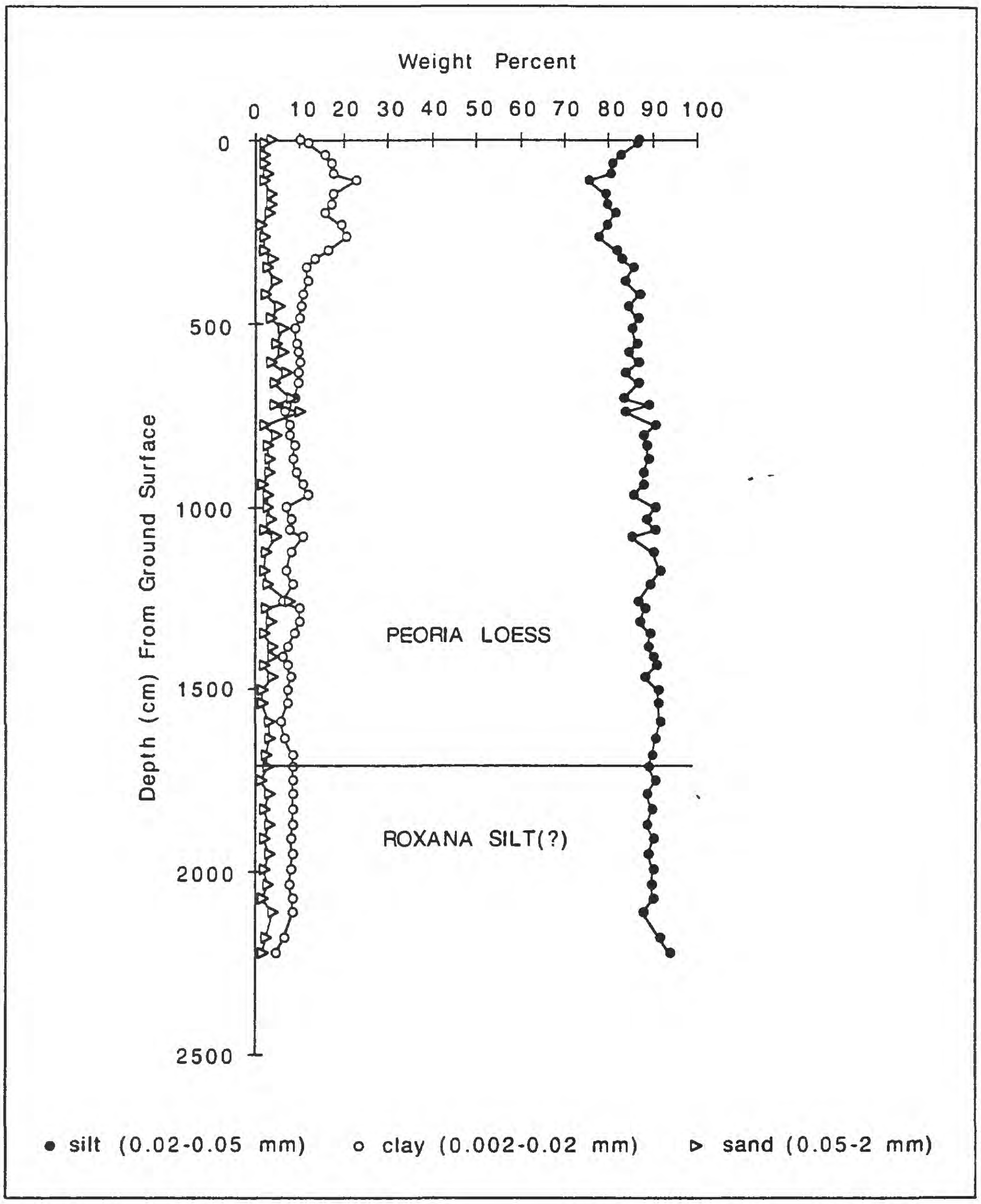


Figure 8. Sand, silt and clay vs. depth for loess samples taken from Helena No. 2 core. Sample intervals given in Table 1. Loess is probably all Peoria, but based on altitude of Peoria Loess/Roxana Silt contact in cut-face of Phillips Bayou quarry, the basal 5 m could be Roxana Silt. Most sand size particles are Mn or carbonate/silica concretions.

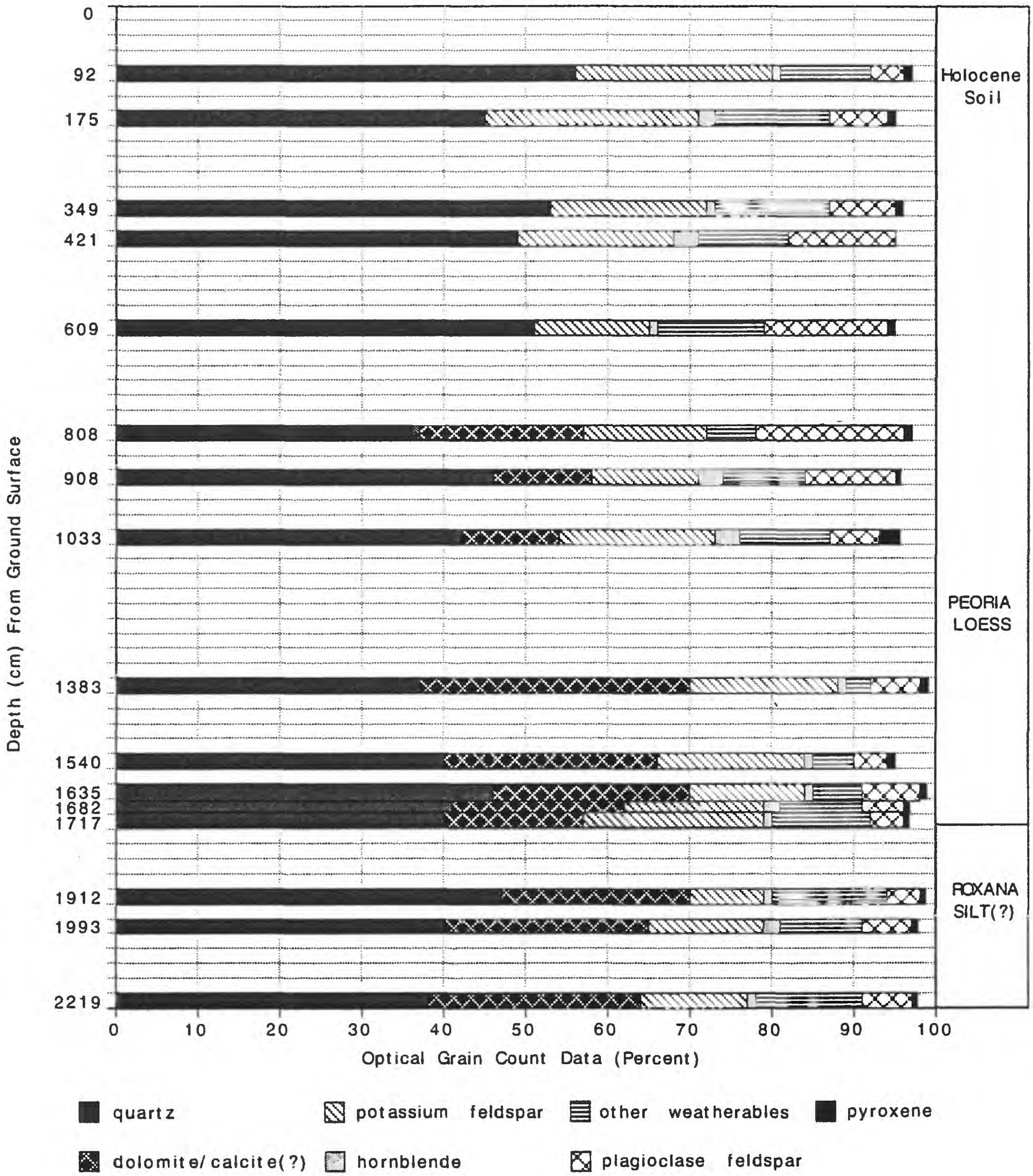


Figure 9. Coarse silt (0.02-0.05 mm) mineralogy of the Peoria Loess for selected samples of the Helena No. 2 core, located just upslope from Phillips Bayou quarry cut-face. Entire core probably Peoria Loess, but basal 5 m are possibly Roxana Silt. X-ray diffraction data for the coarse silt fraction indicate that all carbonate minerals are dolomite. The category "other weatherables" includes all grains that have been weathered (altered) beyond recognition.

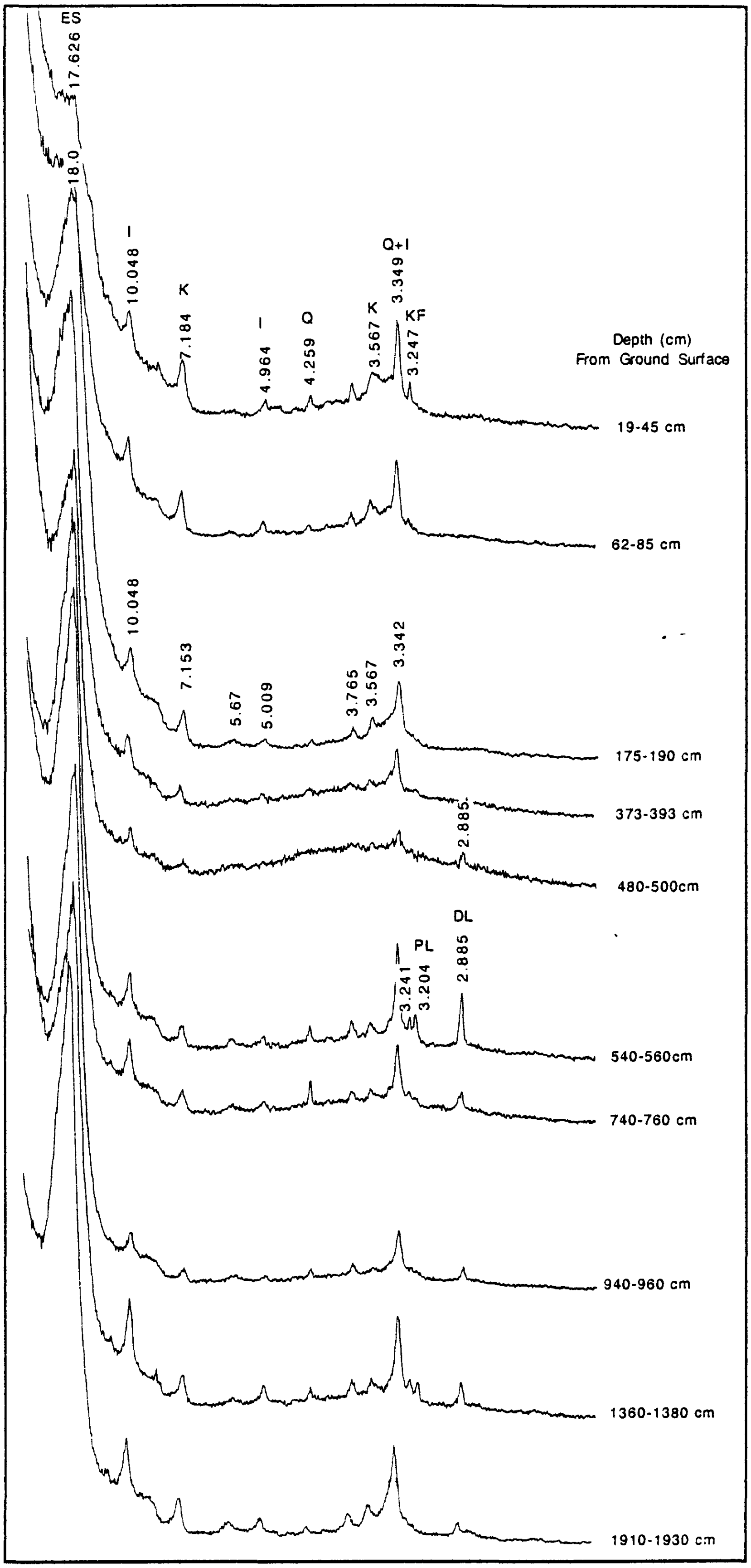


Figure 10. X-raydiffraction patterns for glycolated samples of the <0.002 mm fraction of selected horizons in the Helena No. 1 core, located on crest of Crowleys Ridge near Phillips Bayou, Arkansas. All samples are of Peoria Loess.values are in angstroms. I, illite; ES, expandable smectitic clay; K,kaolinite; Q, quartz; KF, potassium feldspar; PL, plagioclase; D L, dolomite.

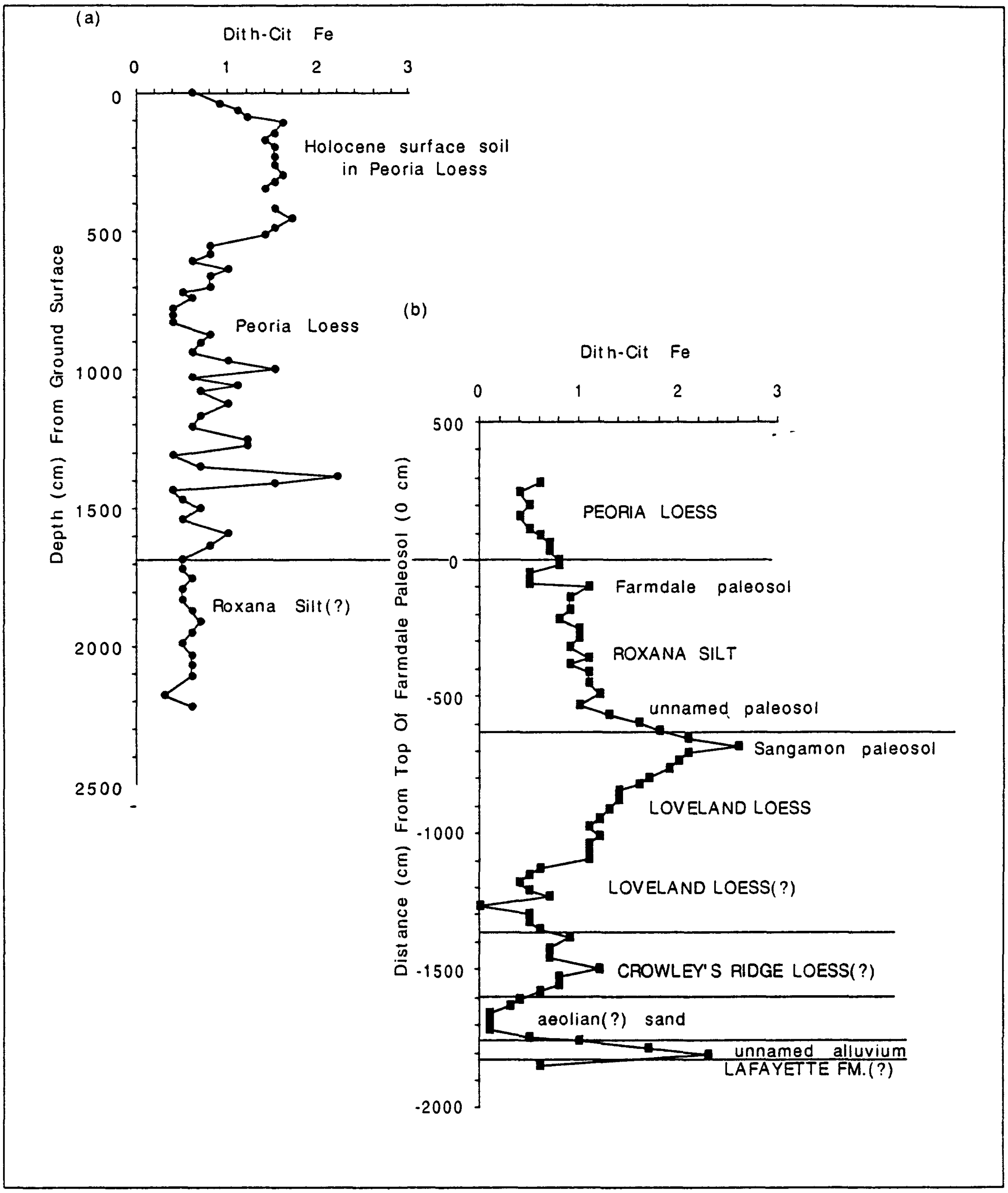


Figure 11. Dithionite-citrate extractable Fe for (a) Helena No. 2 core, and (b) Phillips Bayou quarry cut-face. The 0 cm datum in (b) is the Peoria Loess/Roxana Silt contact at the top of the Farmdale paleosol. This datum is alligned with the projected position of the Peoria Loess/Roxana Silt contact in the Helena No. 2 core based on altitude of contact in the cut-face. Where points are not connected there are no data.

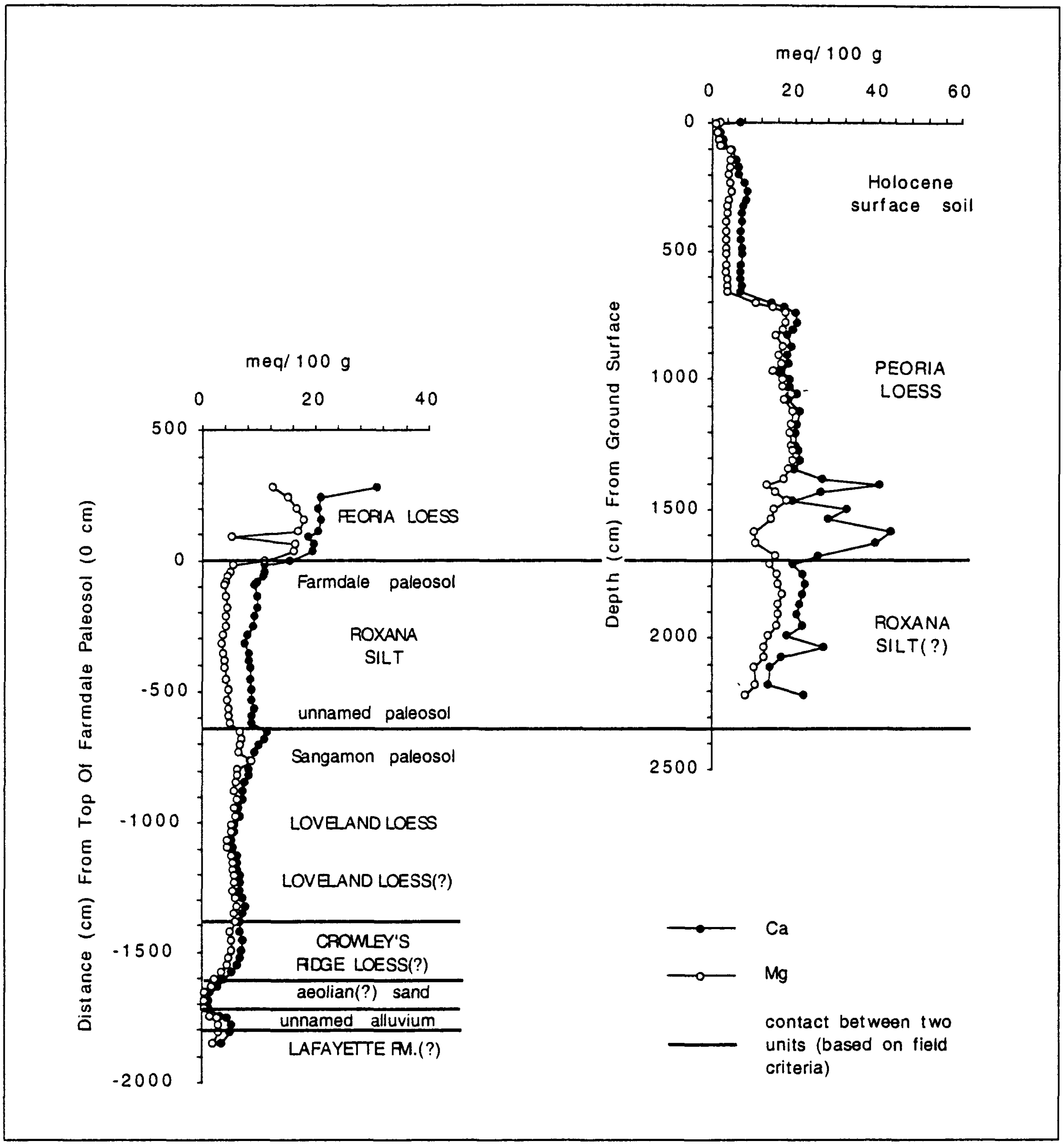


Figure 12. NH_4OAc extractable Mg and Ca for loess. aeolian(?) sand, and alluvium from the Helena No. 2 core and the Phillips Bayou quarry cut-face.

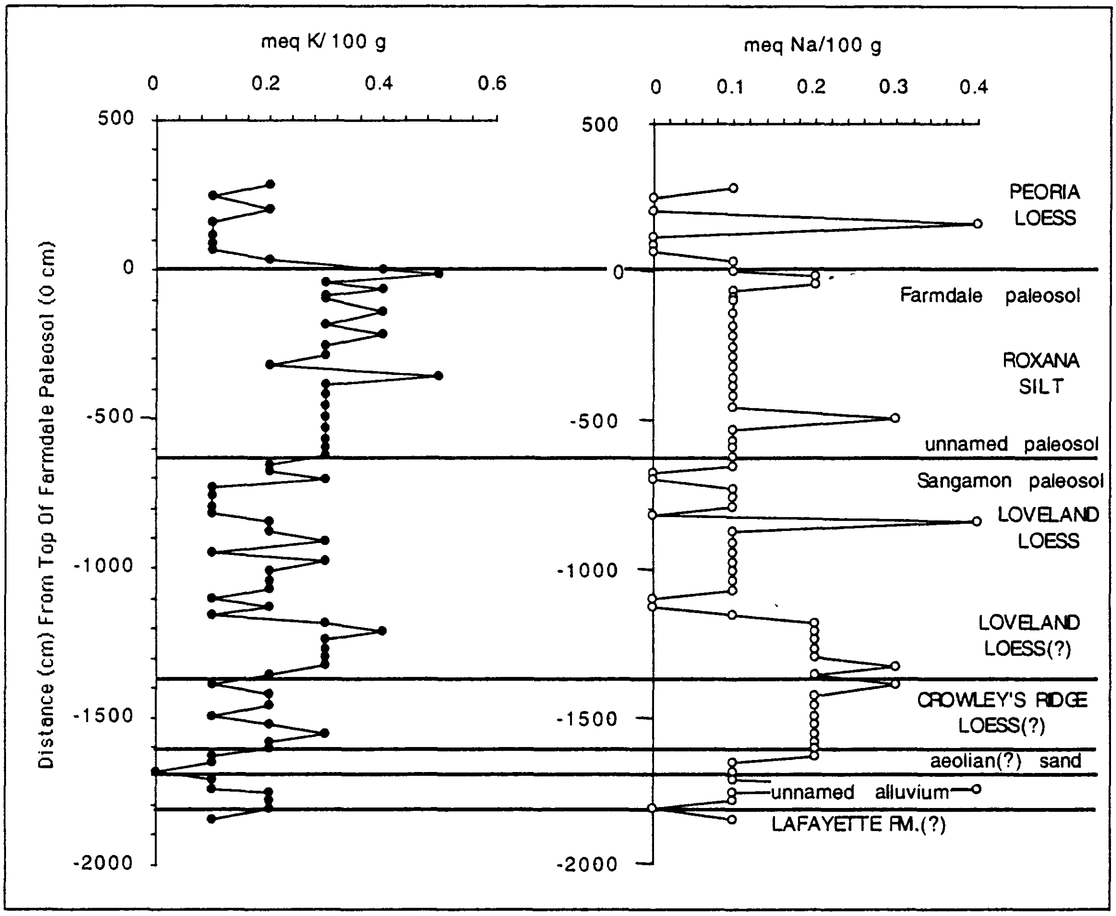


Figure 13. Plots of NH_4OAc extractable Na and K for the Phillips Bayou quarry cut-face. Stratigraphic boundaries as determined in the field are shown by the solid balck lines. No attempt has been made to explain the abrupt increases and decreases in Na.

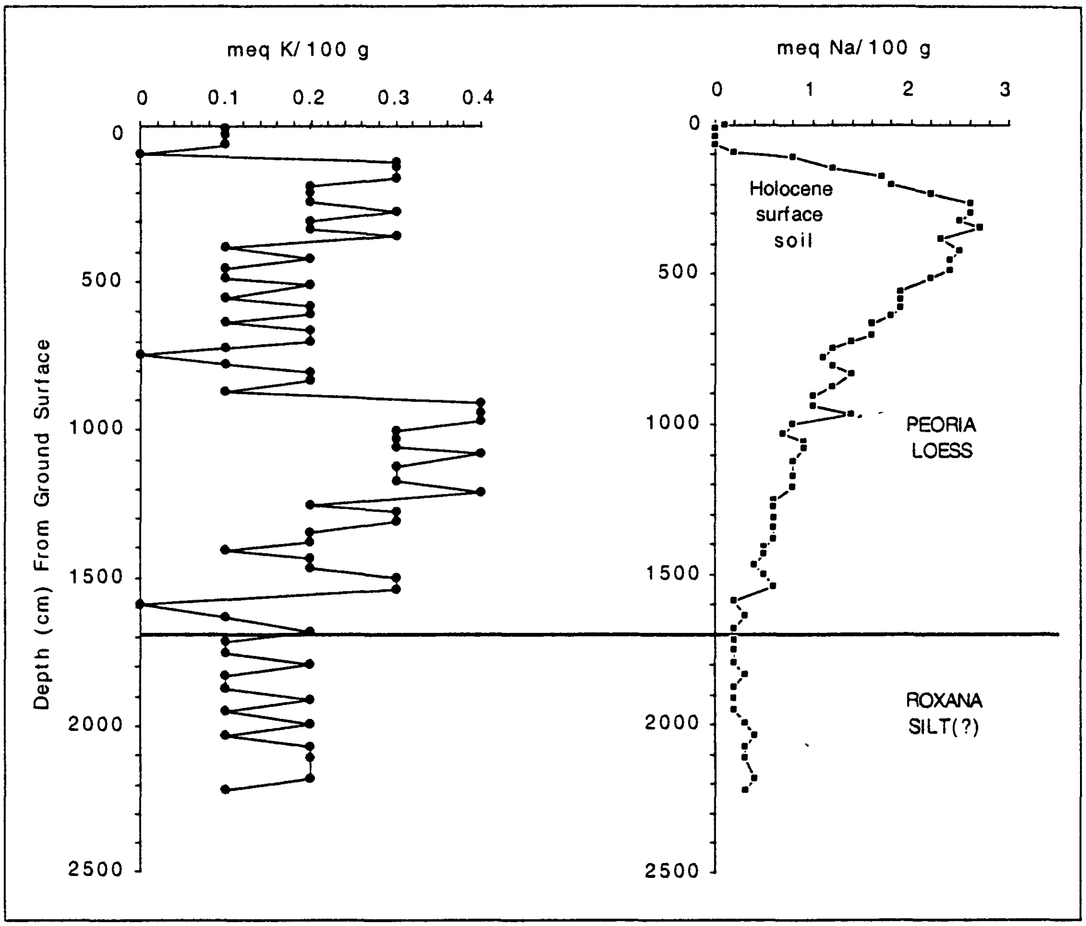


Figure 14. Plots of NH_4OAc extractable Na and K for the Helena No. 2 core. The Peoria Loess/Roxana Silt contact (solid black line) is based on altitude of contact in Phillips Bayou quarry cut-face. Contact cannot be seen in core.

Table 1. TL and Be-10 inventory ages
for selected depths in the Phillips Bayou loess section.
Samples taken from quarry cut-face.

Distance from top of Farmdale plaeosol*	Field No. TL sample	TLTB (Total Bleach) age 10^3 yr	TLTB error bar 10^3 yr	TLPB (Partial Bleach) age 10^3 yr	TLPB error bar 10^3 yr	TLWA (weighted average) age 10^3 yr	TLWA error bar 10^3 yr	Calculated Be-10 age 10^3 yr
+90 cm	MMV-18	26.3	2.3	20.5	3.6	24.7	1.9	
-220 cm	MMV-19	31.3	2.6	38.8	3.8	33.7	2.1	44
-473 cm	MMV-20	43.7	3.9	50.1	5	46.1	3	60
-723 cm	MMV-21	121	16	123	27	122	14	124
-1386 cm	MMV-22	193.7	39.7	173.6	43.0	189	3	183

*/ In the Middle Mississippi River Valley, the Farmdale paleosol marks the paleo-surface of the Roxana Silt and has a C-14 age between 26 and 29 Ka (Markewich, 1993; this report).

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

Letter/number notation are codes used by the National Soil Survey Laboratory in Lincoln, NB for analytical procedures. The reader is referred to Soil Survey Staff (1992) for complete descriptions of these methods. Where data elements are blank, no analysis was run.

horiz. top (cm)	horiz. base (cm)	horiz. desig.	color	horiz. thk. (cm)	cly .002 pct of <2mm 3A1	si .002-.05 pct of <2mm 3A1	s .05-2.0 pct of <2mm 3A1	fcly .0002 pct of <2mm 3A1	CO3 cly .002 pct of <2mm 3A1	fsi .002-.02 pct of <2mm 3A1	csi .02-.05 pct of <2mm 3A1	vfs .05-.10 pct of <2mm 3A1	fs .1-.25 pct of <2mm 3A1	ms .25-.5 pct of <2mm 3A1	cs .5-1.0 pct of <2mm 3A1	vcs 1.0-2.0 pct of <2mm 3A1	orgn C pct 6A1c	total C pct<2 mm 6A2d	KCl Mn	dith-cit Fe pct <2mm 6C2b	dith-cit Al pct <2mm 6G7a	dith-cit Mn pct <2mm 6D2a
										Peoria Loess												
0	10	A	10YR4/2	10	10	86.6	3.4			38.7	47.9	1.9	0.5	0.6	0.3	0.1	2.33	2.53	2.7	0.6	0.1	0.1
10	40	AB	7.5YR3/4	30	11.8	86.3	1.9	6.2		43	43.3	1	0.4	0.4	0.1	0.1	0.47	0.47	1.4	0.7	0.1	0.1
40	67	BA	7.5YR4/4	27	15.6	82.5	1.9			42.2	40.3	1	0.4	0.4	0.1	0.1	0.18	0.25	1.4	0.9	0.1	0.1
67	92	BW2	7.5YR5/4	25	17.2	80.7	2.1			38.6	42.1	1.1	0.5	0.4	0.1	0	0.11	0.14	1.6	1.1	0.1	0.1
92	110	E/B	10YR7/2	18	17.3	80.2	2.5	9.7		36.8	43.4	1.3	0.5	0.5	0.2	0	0.11	0.11	1.2	1.2	0.1	0.1
110	148	BT1	7.5YR4/4	38	22.8	75.4	1.8			31.5	43.9	1.3	0.2	0.2	0.1	0	0.09	0.13	0.6	1.6	0.1	0.1
148	175	BT1	7.5YR4/4	27	17.3	79.1	3.6			34	45.1	3.2	0.2	0.2	0.1	0.1	0.07	0.09	0.8	1.5	0.1	0.1
175	200	BT2	7.5YR5/4	25	17	79.6	3.4	10.1		34.9	44.7	2.7	0.2	0.2	0.2	0.1	0.07	0.1	1.2	1.4	0.1	0.1
200	233	BT3	7.5YR5/4	33	15.7	81.2	3.1			34	47.2	2.8	0.1	0.1	0.1	0.1	0.07		1.5	1.5	0.1	0.1
233	266	BT3	7.5YR5/4	33	19.3	79.5	1.2			38.5	41	0.8	0.2	0.1	0.1	0.1	0.08		0.8	1.5	0.1	0.1
266	300	BT3	7.5YR5/4	34	20.4	77.6	2			38.9	38.7	1.6	0.2	0.2	0.1	0.1	0.08			1.5	0.1	0.1
300	325	BC1	7.5YR4/4	25	16.3	81.8	1.9	9.8		36.3	45.5	1.6	0.2	0.1	0.1	0.1	0.08			1.6	0.1	0.1
325	349	BC1	7.5YR4/4	24	13.4	82.8	3.8			33.4	49.4	3.6	0.1	0.1	0.1	0	0.08			1.5	0.1	0.1
349	385	BC2	7.5YR5/4	36	11.5	85.7	2.8			33.1	52.6	2.6	0.2	0.1	0.1	0.1	0.06	0.09		1.4	0.1	0.1
385	421	BC2	7.5YR5/4	36	11.7	83.6	4.7			33.4	50.2	4.4	0.2	0.1	0.1	0.1	0.07					
421	455	C1	10YR7/2	34	10.6	87	2.4	5.7		32.3	54.7	2.1	0.2	0.1	0.1	0	0.07	0.1		1.5	0.1	0.1
455	489	C1	10YR7/2	34	10.2	84.5	5.3			31.7	52.8	4.8	0.3	0.1	0.1	0	0.07			1.7	0.1	0.1
489	513	C2	10YR4/3	24	9.9	86.6	3.5			30	56.6	2.9	0.4	0.2	0.1	0	0.06			1.5	0.1	0.1
513	555	C3	10YR5/2	42	8.9	85.1	6			28.1	57	5.5	0.4	0.1	0.1	0	0.05			1.4	0.1	0.1
555	582	C4	2.5Y5/2	27	9.1	86.3	4.6			30.8	55.5	3.9	0.5	0.1	0.1	0.1	0.06			0.8	0.1	0.1
582	609	C4	2.5Y5/2	27	9.6	84.3	6.1			30	54.3	5.1	0.7	0.2	0.1	0.1	0.07			0.8	0.1	0.1
609	636	C4	2.5Y5/2	27	9.8	86.7	3.5	7.2		31	55.7	3	0.4	0.1	0.1	0	0.06	0.07		0.6	0.1	0.1

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	color	horiz. thk. (cm)	cly .002 pct of <2mm 3A1	si .002-.05 pct of <2mm 3A1	s .05-2.0 pct of <2mm 3A1	fcly .0002 pct of <2mm 3A1	CO3 cly .002 pct of <2mm 3A1	fsi .002-.02 pct of <2mm 3A1	csi .02-.05 pct of <2mm 3A1	vfs .05-.10 pct of <2mm 3A1	fs .1-.25 pct of <2mm 3A1	ms .25-.5 pct of <2mm 3A1	cs .5-1.0 pct of <2mm 3A1	vcs 1.0-2.0 pct of <2mm 3A1	orgn C pct 6A1c	total C pct<2 mm 6A2d	KCl Mn	dith-cit Fe pct <2mm 6C2b	dith-cit Al pct <2mm 6G7a	dith-cit Mn pct <2mm 6D2a
636	663	C4	2.5Y5/2	27	9.6	83.7	6.7			30.1	53.6	5.9	0.5	0.1	0.1	0.1	0.07			1	0.1	0.1
663	703	C5	10YR5/2	40	9.4	86.5	4.1			31.5	55	3.4	0.6	0.1	0.1	0.1	0.07			0.8	0.1	0.1
703	722	C6	10YR5/4	19	8.7	83.3	8			28.2	55.1	7.4	0.3	0.1	0.1	0.1	0.05			0.8	0.1	0.1
722	744	C7	10YR6/3	22	6.9	88.9	4.2			25.3	63.6	3.7	0.3	0.1	0.1	0	0.03			0.5	0.1	0.1
744	781	C8	10YR7/3	37	6.6	83.6	9.8			29.3	54.3	9.3	0.3	0.1	0.1	0	0.03			0.6	0.1	0.1
781	808	C9	10YR6/3	27	7.6	90.6	1.8			32.8	57.8	1.7	0.1	0.1	0	0	0.04			0.4	0.1	0.1
808	834	C10	10YR6/3	26	7.7	87.7	4.6	6.2		30.1	57.6	4.5	0.1	0.1	0.1	0	0.05	1.69		0.4	0.1	0.1
834	874	C11	10YR6/2	40	8.9	88.4	2.7			31.1	57.3	2.6	0.1	0.1	0.1	0.1	0.05			0.4	0.1	0.1
874	908	C12	10YR6/4	34	8.2	88.9	2.9			34.9	54	2.4	0.4	0.1	0.1	0	0.05			0.8	0.1	0.1
908	942	C12	10YR6/4	34	9.2	87.7	3.1	6.5		30.3	57.4	2.9	0.2	0.1	0.1	0	0.04			0.7	0.1	0.1
942	969	C13	10YR6/3	27	10.6	87.9	1.5			36.9	51	1.2	0.2	0.1	0.1	0	0.04			0.6	0.1	0.1
969	1001	C14	10YR6/4	32	11.9	85.6	2.5			33.6	52	2.4	0.1	0.1	0.1	0.1	0.04			1	0.1	0.1
1001	1033	C14	10YR6/4	32	6.8	90.5	2.7			35.7	54.8	2.1	0.4	0.2	0.1	0.1	0.06			1.5	0.1	0.2
1033	1060	C15	10YR6/2	27	8	88.6	3.4	6		33.9	54.7	3.1	0.2	0.1	0.1	0	0.03			0.6	0.1	0.1
1060	1079	C16	10YR6/4	19	7.6	90.5	1.9			36	54.5	1.5	0.3	0.1	0.1	0	0.05			1.1	0.1	0.1
1079	1124	C17	10YR6/3	45	10.5	85	4.5			35.4	49.6	4	0.3	0.1	0.1	0	0.04			0.7	0.1	0.1
1124	1172	C18	10YR6/3	48	7.8	90	2.2			40.6	49.4	1.8	0.3	0.1	0.1	0	0.05			1	0.1	0.1
1172	1210	C19	10YR7/3	38	6.7	91.5	1.8			40.5	51	1.7	0.1	0.1	0.1	0	0.04			0.7	0.1	0.1
1210	1256	C20	10YR6/3	46	8.3	89.2	2.5	5.5		35.3	53.9	2.4	0.1	0.1	0.1	0	0.04			0.6	0	0.1
1256	1276	C21	10YR7/3	20	6	86.5	7.5			37.8	48.7	7.1	0.3	0.1	0.1	0.1	0.03			1.2	0.1	0.1
1276	1311	C22	10YR6/3	35	9.7	88	2.3			33.5	54.5	2	0.2	0.1	0.1	0	0.05			1.2	0.1	0.1
1311	1347	C23	10YR6/4	36	9.7	87	3.3			37	50	3.1	0.2	0.1	0.1	0	0.04			0.4	0.1	0.1
1347	1383	C23	10YR6/4	36	8.7	89.4	1.9			34.9	54.5	1.7	0.2	0.1	0.1	0	0.04			0.7	0.1	0.1
1383	1408	C24	10YR5/8	25	7.3	88.9	3.8	3.7		34.1	54.8	3.2	0.5	0.1	0.1	0	0.06			2.2	0.1	0.1
1408	1434	C24	10YR5/8	26	6	90.1	3.9			35.4	54.7	3.4	0.3	0.1	0.1	0.1	0.07			1.5	0.1	0.1
1434	1467	C25	10YR6/3	33	7.3	90.8	1.9			32.6	58.2	1.8	0.1	0.1	0.1	0.1	0.05			0.4	0.1	0.1

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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1467	1501	C25	10YR6/3	34	7.9	88.1	4	4.5		28.5	59.6	3.6	0.3	0.1	0.1	0.1	0.05			0.5	0.1	0.1
1501	1540	C26	10YR6/4	39	7.1	91.3	1.6	4		42	49.3	1.3	0.2	0.1	0	0.1	0.07			0.7	0.1	0.1
1540	1589	C27	10YR6/3	49	7.1	91.2	1.7	4.2		37.7	53.5	1.4	0.2	0	0.1	0	0.05			0.5	0.1	0.1
1589	1635	C28	10YR6/3	46	5.7	91.4	2.9			34.3	57.1	2.1	0.3	0.2	0.2	0.1	0.06			1	0.1	0.1
1635	1682	C28	10YR6/3	47	6.4	90.4	3.2	3.4		30.2	60.2	2.8	0.2	0.1	0.1	0.1	0.07			0.8	0.1	0.1
1682	1717	C28	2.5Y6/4	35	8.2	89.6	2.2	4.5		37.7	51.9	1.8	0.3	0.1	0.1	0.1	0.06			0.5	0.1	0.1
1717	1752	C28	2.5Y6/4	35	8.4	89	2.6	4.5		35.9	53.1	2.4	0.2	0.1	0.1	0.1	0.05			0.5	0.1	0.1
1752	1792	C30	2.5Y5/4	40	8.2	90.5	1.3	4.4		36.9	53.6	1.2	0.1	0.1	0.1	0	0.07			0.6	0.1	0.1
1792	1832	C30	2.5Y5/4	40	8.3	88.7	3			32.4	56.3	2.5	0.3	0.1	0.1	0.1	0.07			0.5	0.1	0.1
1832	1872	C30	2.5Y5/4	40	8.3	89.6	2.1			37.8	51.8	1.6	0.4	0.1	0.1	0.1	0.07			0.5	0.1	0.1
1872	1912	C30	2.5Y5/4	40	8.4	88.4	3.2			34.6	53.8	2.9	0.2	0.1	0.1	0.1	0.09			0.6	0.1	0.1
1912	1951	C30	2.5Y5/4	39	7.9	90.1	2	4.5		33.7	56.4	1.8	0.1	0.1	0.1	0.1	0.09			0.7	0	0.1
1951	1993	C30	2.5Y5/4	42	8.2	88.8	3			33.3	55.5	2.6	0.2	0.1	0.1	0	0.11			0.6	0.1	0.1
1993	2035	C31	5Y5/2	42	8.1	89.9	2	4.7		32.7	57.2	1.6	0.3	0.1	0.1	0.1	0.15			0.5	0.1	0.1
2035	2073	C32	2.5Y6/4	38	7.7	89.7	2.6			34.8	54.9	2.4	0.1	0.1	0.1	0	0.08			0.6	0.1	0.1
2073	2111	C32	2.5Y6/4	38	8.4	90.2	1.4	4.3		32.4	57.8	1.3	0.1	0.1	0.1	0	0.1			0.6	0.1	0.1
2111	2180	C33	5GY5/1	69	8.3	87.9	3.8	3.9		30.7	57.2	3.6	0.1	0.1	0.1	0	0.19			0.6	0	0.1
2180	2219	C34	5BG4/1	39	6.3	91.5	2.2	4.3		36.5	55	1.7	0.3	0.1	0.1	0	0.24			0.3	0	0.1
2219	2257	C39	5BG4/1	38	4.5	93.8	1.7	3.7		38.3	55.5	1.4	0.2	0.1	0.1	0	0.21			0.6	0.1	0.1

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	ratio/ clay CEC 8D1	ratio/ clay 15 bar 8D1	NH4OAC extr. Ca meq/ 100g 5B5a 6N2e	NH4OAC extr. Mg meq/ 100g 5B5a 6O2d	NH4OAC extr. Na meq/ 100g 5B5a 6P2b	NH4OAC extr. K meq/ 100g 5B5a 6Q2b	NH4OAC extr. Sum Bases meq/ 100g	acidity meq/ 100g 6H5a	extr. Al meq/ 100g 6G9b	CEC Sum Cats meq/ 100g 5A3a	CEC (NH4OAC) meq/ 100g 5A8b	CEC (bases + Al) 5A3b	Al sat 5G1	Base Sat (sum) in pct 5C3	Base Sat (NH4OAC) meq/ 100g 5C1	CO3 pct <2mm 6E1g	pH H2O 8C1f	pH CaCl2 .01M 8C1f	pH KCL 1N 8C1g
												Peoria Loess									
0	10	A	1.1	0.72	6.9	2.1	0.1	0.1	9.1	7.6	0.4	16.7	11	9.5	4	54	82.7		5.2	5	4.8
10	40	AB	0.53	0.47	1.7	1.1	0	0.1	2.8	6.6	1.1	9.4	6.3	3.9	28	30	44.4		4.9	4.2	4
40	67	BA	0.47	0.49	2.3	1.5	0	0.1	3.9	6.7	1.3	10.5	7.3	5.1	25	36	53.4		4.8	4.1	3.8
67	92	BW2	0.52	0.49	2.8	1.8	0	0	4.6	7.9	1.9	12.5	9	6.5	29	37	51.1		4.9	4	3.7
92	110	E/B	0.62	0.55	2.8	2.3	0.2	0.3	5.6	8.8	2.5	14.4	10.8	8.1	31	39	51.9		4.9	3.8	3.5
110	148	BT1	0.71	0.54	4.9	4.4	0.8	0.3	10.4	10.1	2.3	20.5	16.1	12.7	18	51	64.6		5.1	3.8	3.2
148	175	BT1	0.86	0.65	5.8	4.4	1.2	0.3	11.7	7	1	18.7	14.8	12.7	8	63	79.1		5.1	4	3.4
175	200	BT2	0.89	0.67	6.7	4.4	1.7	0.2	13	5.5	0.6	18.5	15.2	13.6	4	70	85.5		5.2	4.2	3.5
200	233	BT3	0.89	0.66	6.7	4.1	1.8	0.2	12.8	4.7	0.3	17.5	14	13.1	2	73	91.4		5.4	4.5	3.8
233	266	BT3	0.8	0.61	8	4.6	2.2	0.2	15	3.7	0.1	18.7	15.4	15.1	1	80	97.4		5.8	5	4.2
266	300	BT3	0.79	0.61	8.6	4.8	2.6	0.3	16.3	4.1		20.4	16.1			80	101.2		6	5.3	4.5
300	325	BC1	0.89	0.65	8.1	4.3	2.6	0.2	15.2	2.9		18.1	14.5			84	104.8		6.2	5.5	4.8
325	349	BC1	0.98	0.72	7.5	3.8	2.5	0.2	14	2.7		16.7	13.1			84	106.9		6.2	5.6	4.9
349	385	BC2	1.03	0.73	7.1	3.9	2.7	0.3	14	2		16	11.9			87	117.6		6.5	5.8	5
385	421	BC2	1.01	0.71	7.3	3.5	2.3	0.1	13.1	1.9		15	11.8			87	111		6.6	6	5.2
421	455	C1	1.09	0.73	6.9	3.5	2.5	0.2	13.1	1.9		15	11.5			87	113.9		6.6	6	5.2
455	489	C1	1.17	0.79	7	3.5	2.4	0.1	13	2		15	11.9			87	109.2		6.6	6.1	5.3
489	513	C2	1.22	0.78	7.2	3.6	2.4	0.1	13.3	1.5		14.8	12.1			90	109.9		6.8	6.2	5.4
513	555	C3	1.3	0.84	7.1	3.6	2.2	0.2	13.1	1.9		15	11.6			87	112.9		7	6.4	5.6
555	582	C4	1.24	0.76	7	3.6	1.9	0.1	12.6	0.5		13	11.3			96	111.5		7.2	6.6	5.7
582	609	C4	1.23	0.74	6.9	3.6	1.9	0.2	12.6	0		12.6	11.8			100	106.8		7.3	6.8	5.9
609	636	C4	1.18	0.69	7	3.8	1.9	0.2	12.9	0.1		13	11.6			99	111.2		7.5	6.9	6

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636	663	C4	1.2	0.71	7.3	4	1.8	0.1	13.2	1.6		14.8	11.5			89	114.8		7.8	7.2	6.3
663	703	C5	1.23	0.7	7	3.9	1.6	0.2	12.7	1		13.7	11.6			93	109.5	0.1	7.9	7.3	6.5
703	722	C6	1.18	0.77	14.3	10.6	1.6	0.2	26.7	7			10.3				259.2	1.9	7.9	7.3	6.8
722	744	C7	1.29	0.84	17.4	14.6	1.4	0.1	33.5	2			8.9				376.4	10	7.9	7.4	6.9
744	781	C8	1.32	0.85	20.3	17.6	1.2	0	39.1	1.2			8.7				449.4	13.8	7.9	7.4	7
781	808	C9	1.13	0.72	20.5	17.9	1.1	0.1	39.6	0.7			8.6				460.5	16.5	8	7.4	7
808	834	C10	1.21	0.75	19.6	17.2	1.2	0.2	38.2	0.8			9.3				410.8	13.1	8	7.4	6.9
834	874	C11	1.15	0.72	18.2	15.5	1.4	0.2	35.3	1.4			10.2				346.1	9.3	7.9	7.3	6.8
874	908	C12	1.22	0.87	19.1	17.1	1.2	0.1	37.5	1.3			10				375	12.1	8	7.4	6.9
908	942	C12	1.24	0.8	18	16	1	0.4	35.4	1			11.4				310.5	6.9	7.9	7.3	6.8
942	969	C13	1.17	0.75	18.4	16.6	1	0.4	36.4	0.4			12.4				293.5	6	7.9	7.3	6.8
969	1001	C14	1.12	0.78	16.8	14.6	1.4	0.4	33.2	0.6			13.3				249.6	3.8	7.9	7.3	6.7
1001	1033	C14	1.18	0.99	18.8	17.1	0.8	0.3	37	1.1			8				462.5	12.1	8	7.3	7
1033	1060	C15	1.19	0.76	18.7	17.1	0.7	0.3	36.8	1.6			9.5				387.4	9.7	8	7.3	6.9
1060	1079	C16	1.14	0.95	20.5	19	0.9	0.3	40.7	0.8			8.7				467.8	13.5	8	7.3	6.9
1079	1124	C17	1.1	0.72	18.6	17.4	0.9	0.4	37.3	1.4			11.5				324.3	8.1	8	7.3	6.8
1124	1172	C18	1.23	0.87	21	19.5	0.8	0.3	41.6	1.5			9.6				433.3	12.4	8	7.3	6.9
1172	1210	C19	1.24	0.82	20.4	19	0.8	0.3	40.5	0.8			8.3				488	16	8	7.4	6.9
1210	1256	C20	1.13	0.71	20.2	18.9	0.8	0.4	40.3	1.6			9.4				428.7	11.2	7.9	7.3	6.9
1256	1276	C21	1.3	1.05	20.2	19.1	0.6	0.2	40.1	1.3			7.8				514.1	16.2	8	7.3	7
1276	1311	C22	0.89	0.6	20.8	19.3	0.6	0.3	41	1.5			8.6				476.7	16.1	8	7.4	7
1311	1347	C23	0.89	0.57	21	19.6	0.6	0.3	41.5	0			8.6				482.6	16.6	8	7.4	6.9
1347	1383	C23	0.95	0.64	19.7	18.5	0.6	0.2	39	1.2			8.3				469.9	14.1	7.9	7.2	6.8
1383	1408	C24	0.79	0.77	26.5	17.5	0.6	0.2	44.8	0.7			5.8				772.4	23.5	7.9	7.4	7.2
1408	1434	C24	0.85	0.82	40.1	13.3	0.5	0.1	54	0.7			5.1				0	27.8	7.9	7.5	7.3
1434	1467	C25	0.93	0.66	26.3	15.5	0.5	0.2	42.5	1.1			6.8				625	19.2	7.9	7.4	7.2

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	ratio/ clay CEC 8D1	ratio/ clay 15 bar 8D1	NH4OAC extr. Ca meq/ 100g 5B5a 6N2e	NH4OAC extr. Mg meq/ 100g 5B5a 6O2d	NH4OAC extr. Na meq/ 100g 5B5a 6P2b	NH4OAC extr. K meq/ 100g 5B5a 6Q2b	NH4OAC extr. Sum Bases meq/ 100g	acidity meq/ 100g 6H5a	extr. Al meq/ 100g 6G9b	CEC Sum Cats meq/ 100g 5A3a	CEC (NH4OAC) meq/ 100g 5A8b	CEC (bases + Al) 5A3b	Al sat 5G1	Base Sat (sum) in pct 5C3	Base Sat (NH4OAC) meq/ 100g 5C1	CO3 pct <2mm 6E1g	pH H2O 8C1f	pH CaCl2 .01M 8C1f	pH KCL 1N 8C1g
1467	1501	C25	1.01	0.62	19.6	18	0.4	0.2	38.2	0.1			8				477.5	14	7.9	7.3	6.9
1501	1540	C26	0.94	0.68	32.3	15.2	0.5	0.3	48.3	0			6.7				720.9	20.1	7.9	7.4	7.3
1540	1589	C27	0.94	0.63	27.8	14.4	0.6	0.3	43.1	0.1			6.7				643.3	18.6	8	7.3	7.2
1589	1635	C28	0.84	0.68	42.9	10.2	0.2	0	53.3	0			4.8				0	26.8	7.9	7.3	7.3
1635	1682	C28	0.94	0.7	39.3	10.8	0.3	0.1	50.4	0			6				840	22.8	7.9	7.3	7.3
1682	1717	C28	0.99	0.63	25.6	15.5	0.2	0.2	41.5	0			8.1				512.3	15.2	7.9	7.3	7.1
1717	1752	C28	0.99	0.67	19.4	13.9	0.2	0.1	33.6	0.3			8.3				404.8	14.6	7.9	7.2	7
1752	1792	C30	0.98	0.65	21.9	15.8	0.2	0.1	38	0			8				475	14.6	7.9	7.2	7.1
1792	1832	C30	0.9	0.55	22.4	16.2	0.2	0.2	39	0.7			7.5				520	15.5	7.9	7.2	7
1832	1872	C30	0.9	0.6	21.7	17.2	0.3	0.1	39.3	0			7.5				524	16.1	7.9	7.2	7
1872	1912	C30	0.88	0.63	21	16.1	0.2	0.1	37.4	0.7			7.4				505.4	15.6	7.9	7.2	7
1912	1951	C30	0.91	0.71	20.6	16	0.2	0.2	37	0.4			7.2				513.9	15.6	7.9	7.2	7
1951	1993	C30	0.84	0.62	21.9	15.8	0.2	0.1	38	0			6.9				550.7	16	7.9	7.2	7.1
1993	2035	C31	0.83	0.61	18	13.6	0.3	0.2	32.1	0.2			6.7				479.1	17	7.8	7.2	7.1
2035	2073	C32	0.87	0.66	26.8	12.8	0.4	0.1	40.1	0.4			6.7				598.5	17.4	7.9	7.3	7.2
2073	2111	C32	0.81	0.58	16.8	12.7	0.3	0.2	30	0.2			6.8				441.2	16.8	7.8	7.2	7.1
2111	2180	C33	0.75	0.58	14.2	10.2	0.3	0.2	24.9	0.3			6.2				401.6	16.7	7.8	7.3	7.2
2180	2219	C34	0.9	0.73	13.8	10.8	0.4	0.2	25.2	0.4			5.7				442.1	16.6	7.5	7.1	7.1
2219	2257	C39	1.18	0.98	22.1	8.3	0.3	0.1	30.8	0			5.3				581.1	19	7.8	7.5	7.2

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas.

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	water content 2bar pct of <2mm 4B1a	water content 15bar pct of <2mm 4B2a	air dry:oven dry	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
							Peoria Loess			
0	10	A	13.3	7.2	1.009					
10	40	AB	11.8	5.6	1.007		VR 3KK 3MI 2MT 1QZ 1	17	7	1.1
40	67	BA	13.3	7.6	1.008					
67	92	BW2	14.6	8.5	1.011					
92	110	E/B	14.7	9.5	1.013	QZ56 FK24 OW11 FP4 HN1 MS1 BT1 OP1 AM1 PR1 GStr ZRtr TMtr POtr FEtr	MT 3VR 2MI 2KK 2	19	10.9	1.6
110	148	BT1	18.5	12.4	1.018					
148	175	BT1	16.8	11.3	1.015					
175	200	BT2	17.2	11.4	1.015	QZ45 FK26 OW14 FP7 HN2 MI2 OP1 MS1 AM1 ZRtr TMtr BTtr GStr PRtr FEtr SStr POtr	MT 3VR 2MI 2KK 2MM 1	18	12.2	1.3
200	233	BT3	16.5	10.4	1.015					
233	266	BT3	19.4	11.8	1.016					
266	300	BT3	20	12.4	1.017					
300	325	BC1	17.3	10.6	1.015					
325	349	BC1	15	9.6	1.014					
349	385	BC2	13.4	8.4	1.012	QZ53 FK19 OW14 FP8 OP2 HN1 BT1 PR1 MS1 AMtr MItr POtr FEtr RUtr ZRtr GStr GNtr	MT 3MI 2KK 2VC 1	13	12.2	1.3
385	421	BC2	13.3	8.3	1.012					
421	455	C1	12.5	7.7	1.011	QZ49 FK19 FP13 OW11 HN3 MI2 BT1 OP1 MStr PRtr ZRtr POtr TMtr FEtr GNtr	MT 3MI 2KK 2GE 1MM 1	11	12.2	1.1
455	489	C1		8.1	1.012					
489	513	C2	12.4	7.7	1.012					
513	555	C3	11.8	7.5	1.012					
555	582	C4	10.8	6.9	1.011					
582	609	C4		7.1	1.011					
609	636	C4		6.8	1.011	QZ51 FP15 FK14 OW13 PR2 OP2 MS1 HN1 BTtr TMtr MItr AMtr POtr FEtr GStr ZRtr GNtr	MT 3MI 2KK 2VR 1	12	9.7	1.5

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas.

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	water content 2bar pct of <2mm 4B1a	water content 15bar pct of <2mm 4B2a	air dry:oven dry	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
636	663	C4	10.9	6.8	1.011					
663	703	C5	11.2	6.6	1.011					
703	722	C6		6.7	1.01					
722	744	C7	9.3	5.8	1.008					
744	781	C8		5.6	1.008					
781	808	C9	8.8	5.5	1.009					
808	834	C10		5.8	1.008	QZ37 DL20 FP18 FK15 OW6 PR2 OP1 AM1 GStr HNtr BTtr MItr FEtr MStr TMtr ZRtr GNtr	MT 3VR 2MI 2KK 2	8.2	7.9	1.2
834	874	C11		6.4	1.01					
874	908	C12		7.1	1.011					
908	942	C12		7.4	1.012	QZ46 FK13 DL12 FP11 OW10 HN3 OP3 MS1 PR1 GStr MItr TMtr ZRtr AMtr BTtr GNtr	MT 3MI 2KK 2CL 1GE 1			
942	969	C13		8	1.012					
969	1001	C14		9.3	1.014					
1001	1033	C14		6.7	1.008					
1033	1060	C15		6.1	1.01	QZ42 FK19 DL12 OW11 FP6 HN3 PR3 MI2 OP1 MS1 BT1 AMtr TMtr GStr ZRtr GNtr FCtr	MT 3MI 2KK 2CL 1QZ 1			
1060	1079	C16		7.2	1.009					
1079	1124	C17		7.6	1.011					
1124	1172	C18		6.8	1.01					
1172	1210	C19		5.5	1.009		MT 3VR 2MI 2KK 2			
1210	1256	C20		5.9	1.009					
1256	1276	C21		6.3	1.008					
1276	1311	C22		5.8	1.008					
1311	1347	C23		5.5	1.008					
1347	1383	C23		5.6	1.007					
1383	1408	C24		5.6	1.006	QZ37 DL33 FK18 FP6 OW3 AM1 HN1 OPtr MItr GNtr BTtr PRtr FEtr ZRtr GAtr POtr	MT 2MM 2MI 2GE 2CL 1			
1408	1434	C24		4.9	1.005					
1434	1467	C25		4.8	1.006					

Table 2. Data from Helena No. 2 core at Phillips Bayou, upslope from quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas.

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	water content 2bar pct of <2mm 4B1a	water content 15bar pct of <2mm 4B2a	air dry:oven dry	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
1467	1501	C25		4.9	1.008		MT 3MI 2KK 2MM 1			
1501	1540	C26		4.8	1.005		MT 3MI 2KK 1QZ 1			
1540	1589	C27		4.5	1.006	QZ40 DL26 FK18 OW5 FP4 MI2 MS1 OP1 HN1 AM1 PRtr GStr FEtr CLtr ZRtr GNtr TMtr BTtr	MT 3MI 2KK 2MM 1QZ 1			
1589	1635	C28		3.9	1.004					
1635	1682	C28		4.5	1.004	QZ46 DL24 FK14 FP7 OW6 HN1 OP1 MS1 MItr AMtr BTtr TMtr PRtr GStr GNtr ZRtr FEtr	MT 3MI 2KK 2MM 1GE 1			
1682	1717	C28		5.2	1.007	QZ41 DL21 FK17 OW10 FP5 MS2 OP2 HN1 MI1 PRtr ZRtr AMtr GStr BTtr TMtr GNtr	MT 3MI 2KK 2MM 1GE 1			
1717	1752	C28		5.6	1.008	QZ40 FK22 DL17 OW12 FP4 PR2 HN1 MS1 MI1 OPtr GStr TMtr AMtr GNtr FEtr BTtr ZRtr	MT 3MI 2KK 2VR 2			
1752	1792	C30		5.3	1.008		MT 3MI 2KK 2QZ 1			
1792	1832	C30		4.6	1.008					
1832	1872	C30		5	1.008					
1872	1912	C30		5.3	1.008					
1912	1951	C30		5.6	1.008	QZ47 DL23 OW14 FK9 FP4 PR1 OP1 HN1 MStr MItr AMtr BTtr GStr FCtr GNtr ZRtr TMtr				
1951	1993	C30		5.1	1.007					
1993	2035	C31		4.9	1.006	QZ40 DL25 FK14 OW10 FP6 HN2 OP1 PR1 AMtr MStr MItr GStr GNtr BTtr TMtr ZRtr	MT 3MI 2KK 2VR 1GE 1			
2035	2073	C32		5.1	1.007					
2073	2111	C32		4.9	1.007					
2111	2180	C33		4.8	1.007		MT 3MI 3KK 2VR 1GE 1			
2180	2219	C34		4.6	1.005		MT 4KK 3MI 2QZ 1			
2219	2257	C39		4.4	1.005	QZ38 DL26 OW13 FK13 FP6 HN1 MS1 OP1 ZR1 MItr AMtr BTtr GStr GNtr TMtr	MT 4KK 3MI 3FD 1			

Table 3. Data for Phillips Bayou quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	color	horiz. thk. (cm)	cly .002 pct of <2mm 3A1	si .002-.05 pct of <2mm 3A1	s .05-2.0 pct of <2mm 3A1	fcly .0002 pct of <2mm 3A1	CO3 cly .002 pct of <2mm 3A1	fsi .002-.02 pct of <2mm 3A1	csi .02-.05 pct of <2mm 3A1	vfs .05-.10 pct of <2mm 3A1	fs .1-.25 pct of <2mm 3A1	ms .25-.5 pct of <2mm 3A1	cs .5-1.0 pct of <2mm 3A1	vcs 1.0-2.0 pct of <2mm 3A1	orgn C pct 6A1c	total C pct<2 mm 6A2d	dith-cit Fe pct <2mm 6C2b	dith-cit Al pct <2mm 6G7a	dith-cit Mn pct <2mm 6D2a	ratio/ clay CEC 8D1
Peoria Loess																						
281	245	C	2.5Y6/4	36	6.3	91.5	2.2	3.5	0.6	41.3	50.2	0.6	0.1	0.3	0.5	0.7	0.08	2.12	0.6	0.1	0.1	1.29
245	202	C	2.5Y5/2	43	9.1	89.7	1.2		0.6	45	44.7	0.6	0.1	0.1	0.1	0.3	0.11		0.4	0.1	0.1	1
202	159	C	2.5Y5/2	43	8.8	90.6	0.6	5.4	0.3	44	46.6	0.5	0.1	0.1	0.1	0	0.1	2.34	0.5	0.1	0.1	0.95
159	115	C	2.5Y5/2	44	7.4	91.2	1.4		0.6	43.5	47.7	1.2	0.1	0.1	0.1	0	0.09		0.4	0.1	0.1	1.05
115	90	C	10YR6/3	25	7.7	90.3	2	5.9		42.9	47.4	1.6	0.1	0.1	0.1	0.1	0.07	2.57	0.5	0.1	0.1	1.03
90	65	C	10YR5/3	25	8.4	89.8	1.8			41.8	48	1.5	0.1	0.1	0.1	0.1	0.09	2.46	0.6	0.1	0.1	0.96
65	35	C	10YR5/3	30	10.6	88.3	1.1		0.6	41.3	47	0.9	0.1	0.1	0.1	0	0.13	1.91	0.7	0.1	0.1	0.89
35	0	C	10YR5/3	35	12.6	85.2	2.2	9.6		39.8	45.4	2	0.1	0.1	0.1	0	0.17	1.23	0.7	0.1	0.1	0.87
Roxana Silt																						
0	-17	2A1	10YR4/3	17	14.7	84	1.3	10		37.1	46.9	1.1	0.1	0.1	0.1	0	0.2	0.55	0.8	0.1	0	0.85
-17	-43	2A2	10YR4/2	26	16.5	82.3	1.2	11.6		36.2	46.1	1	0.1	0.1	0.1	0	0.33	0.39	0.8	0.1	0	0.88
-43	-62	2A3	10YR4/2	19	16.2	82.2	1.6	11.6		34.4	47.8	1.4	0.1	0.1	0.1	0	0.38	0.43	0.5	0.1	0	0.89
-62	-85	2A4	10YR3/2	23	15.4	82.8	1.8			35.3	47.5	1.6	0.1	0.1	0.1	0	0.41	0.47	0.5	0.1	0	0.9
-85	-96	2A5	10YR3/2	11	14.6	83.6	1.8	9.7		34.9	48.7	1.6	0.1	0.1	0.1	0.1	0.3	0.36	0.5	0.1	0	0.88
-96	-140	2BT1	10YR5/3	44	13.3	82.9	3.8	9		34.2	48.7	3.1	0.3	0.2	0.2	0	0.14	0.18	1.1	0.1	0	0.9
-140	-184	2BT1	10YR5/3	44	13.8	84	2.2	9.3		35	49	1.8	0.3	0.1	0.1	0	0.12	0.14	0.9	0.1	0	0.93
-184	-218	2BT2	10YR6/3	34	14	83.4	2.6	9.6		32.6	50.8	2.2	0.4	0.1	0	0	0.11	0.15	0.9	0.1	0	0.94
-218	-252	2BT2	10YR6/3	34	14	83.7	2.3			32.5	51.2	1.9	0.3	0.1	0.1	0.1	0.1	0.13	1	0.1	0	0.91
-252	-285	2BT2	10YR6/3	33	13.6	83.5	2.9	9.8		32.3	51.2	2.5	0.3	0.1	0.1	0	0.1	0.12	1	0.1	0	0.89
-285	-322	2BT3	10YR6/4	37	12.9	85	2.1			33.2	51.8	1.8	0.2	0.1	0.1	0.1	0.07		1	0.1	0	0.86
-322	-359	2BT3	10YR6/4	37	10.4	86.6	3	6.8		34.2	52.4	2.2	0.6	0.2	0.1	0	0.07		0.9	0.1	0	0.95

Table 3. Data for Phillips Bayou quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	horiz. base (cm)	horiz. desig.	color	horiz. thk. (cm)	cly .002 pct of <2mm 3A1	si .002-.05 pct of <2mm 3A1	s .05-2.0 pct of <2mm 3A1	fcly .0002 pct of <2mm 3A1	CO3 cly .002 pct of <2mm 3A1	fsi .002-.02 pct of <2mm 3A1	csi .02-.05 pct of <2mm 3A1	vfs .05-.10 pct of <2mm 3A1	fs .1-.25 pct of <2mm 3A1	ms .25-.5 pct of <2mm 3A1	cs .5-1.0 pct of <2mm 3A1	vcs 1.0-2.0 pct of <2mm 3A1	orgn C pct 6A1c	total C pct<2 mm 6A2d	dith-cit Fe pct <2mm 6C2b	dith-cit Al pct <2mm 6G7a	dith-cit Mn pct <2mm 6D2a	ratio/ clay CEC 8D1
-359	-387	2BT4	10YR6/4	28	12.8	85.3	1.9			36.9	48.4	1.1	0.4	0.3	0.1	0	0.09		1.1	0.1	0	0.86
-387	-415	2BT4	10YR6/4	28	14.2	83.3	2.5			35.5	47.8	1.8	0.3	0.3	0.1	0	0.08		0.9	0.1	0	0.8
-415	-454	2BT5	7.5YR5/4	39	15.4	82.7	1.9			37.8	44.9	1.2	0.3	0.3	0.1	0.1	0.1		1.1	0.1	0	0.75
-454	-493	2BT5	7.5YR5/4	39	15.6	82.3	2.1			37.6	44.7	1.4	0.3	0.3	0.1	0.1	0.12		1.1	0.1	0	0.73
-493	-532	2BT5	7.5YR5/4	39	15.8	81.9	2.3			37	44.9	1.3	0.3	0.4	0.2	0.1	0.13	0.18	1.2	0.1	0	0.83
-532	-568	2BT	10YR4/3	36	16.8	81	2.2			35.1	45.9	1.8	0.2	0.1	0.1	0	0.16		1	0.1	0	0.74
-568	-594	2AT	10YR4/3	26	17.8	79.8	2.4			35.2	44.6	1.5	0.3	0.3	0.2	0.1	0.17		1.3	0.1	0	0.71
-594	-623	2ABT	10YR4/4	29	19.6	76.2	4.2			33.1	43.1	2.7	0.5	0.4	0.3	0.3	0.11	0.19	1.6	0.1	0	0.62
Loveland Loess																						
-623	-656	3BT1	7.5YR5/4	33	22.4	75.6	2			33.8	41.8	1.2	0.3	0.3	0.2	0.1	0.09		1.8	0.1	0.1	0.53
-656	-680	3BT2	7.5YR4/6	24	29.7	67.2	3.1			31.9	35.3	1.1	0.8	0.7	0.4	0.1	0.09	0.14	2.1	0.2	0.6	0.55
-680	-703	3BT2	7.5YR4/6	23	31.7	67.1	1.2			33.2	33.9	0.8	0.2	0.2	0.1	0.1	0.09		2.6	0.2	0.1	0.38
-703	-732	3BT3	7.5YR5/6	29	25.5	73.7	0.8			37.3	36.4	0.6	0.1	0.1	0.1	0	0.06		2.1	0.2	0.1	0.59
-732	-761	3BT3	7.5YR5/6	29	25.8	72.3	1.9			36	36.3	1.7	0.1	0.1	0.1	0	0.06		2	0.1	0.1	0.55
-761	-796	3BT4	7.5YR4/6	35	23.4	76.2	0.4			38.1	38.1	0.4	0.1	0	0.1	0	0.04		1.9	0.1	0.1	0.58
-796	-820	3BT5	7.5YR4/6	24	19.3	80.3	0.4			39.9	40.4	0.4	0.1	0.1	0.1	0	0.04		1.7	0.1	0.1	0.67
-820	-843	3BT5	7.5YR4/6	23	18.2	81.5	0.3			42.1	39.4	0.3	0.1	0.1	0.1	0	0.04	0.05	1.6	0.1	0.1	0.71
-843	-877	3BCT	10YR5/4	34	16.7	83	0.3			45	38	0.3	0.1	0.1	0.1	0	0.04	0.04	1.4	0.1	0.1	0.73
-877	-911	3BCT	10YR5/4	34	15.3	82.1	2.6			40.3	41.8	2.3	0.2	0.1	0.1	0.1	0.03		1.4	0.1	0.1	0.77
-911	-946	3BCT	10YR5/4	35	16.2	83.2	0.6			41.1	42.1	0.5	0.1	0.1	0	0	0.04		1.3	0.1	0.1	0.76

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-946	-977	3C1	10YR5/4	31	13.3	85.5	1.2			43.2	42.3	1	0.1	0.1	0	0	0.02		1.2	0.1	0.1	0.85
-977	-1008	3C1	10YR5/4	31	13.8	85.5	0.7			45	40.5	0.6	0.1	0.1	0.1	0	0.04	0.02	1.1	0.1	0.1	0.86
-1008	-1039	3C1	10YR5/4	31	11	88.1	0.9			41.7	46.4	0.7	0.1	0.1	0	0	0.01		1.2	0.1	0.1	0.94
-1039	-1069	3C1	10YR5/4	30	12	86.6	1.4			40.5	46.1	1.2	0.1	0.1	0.1	0	0.03		1.1	0.1	0.1	0.86
-1069	-1099	3C2	10YR5/4	30	8.5	89.4	2.1			40.5	48.9	1.7	0.2	0.1	0.1	0	0.03	0.04	1.1	0.1	0.1	1.06
-1099	-1128	3C2	10YR5/4	30	9.1	90.2	0.7			48.3	41.9	0.6	0.1	0.1	0.1	0.1	0.01		1.1	0.1	0.1	0.99
-1128	-1155	3C3	10YR6/4	27	11.3	87.4	1.3			45.2	42.2	1.2	0.1	0.1	0.1	0	0.02		0.6	0.1	0.1	0.96
-1155	-1182	3C3	10YR6/4	27	11.2	87.8	1			44.5	43.3	0.9	0.1	0.1	0.1	0	0.02		0.5	0.1	0.1	0.99
-1182	-1209	3C3	10YR6/4	27	11.9	84.7	3.4			35.1	49.6	2.9	0.3	0.1	0.1	0.1	0.02	0.03	0.4	0.1	0.1	0.95
-1209	-1236	3C3	7.5YR6/3	27	13.4	84.4	2.2			35.9	48.5	1.7	0.3	0.1	0.1	0	0.04		0.5	0.1	0.1	0.86
-1236	-1266	3C4	7.5YR6/3	30	13.4	83.5	3.1			32.7	50.8	2.8	0.2	0.1	0.1	0	0.02	0.04	0.7	0.1	0.1	0.85
-1266	-1295	3C4	7.5YR6/3	29	12.9	84.1	3			29.4	54.7	2.5	0.3	0.1	0.1	0	0.03		0.7	0.1	0.1	0.89
-1295	-1325	3C5	10YR6/4	30	14.3	79.6	6.1			29.7	49.9	5.6	0.3	0.1	0.1	0	0.03		0.5	0.1	0.1	0.87
-1325	-1355	3C5	10YR6/4	30	12.5	84.4	3.1			31	53.4	2.8	0.2	0.1	0.1	0	0.01	0.04	0.5	0.1	0.1	0.99
-1355	-1386	3C5	10YR6/4	31	12.4	84.1	3.5			33.1	51	3.4	0.1	0.1	0.1	0.1	0.03		0.6	0.1	0.1	1.01
										Crowleys Ridge Loess												
-1386	-1423	4A	10YR6/4	37	10.1	86.8	3.1			33.4	53.4	2.7	0.2	0.1	0.1	0.1	0.02	0.04	0.9	0.1	0.1	1.05
-1423	-1459	4C	10YR5/4	36	10.6	83.7	5.7			30.9	52.8	4.5	0.6	0.4	0.2	0.1	0.02	0.03	0.7	0.1	0.1	1.05
-1459	-1496	4C	10YR5/4	37	10.6	85.9	3.5			31.8	54.1	2.2	0.8	0.4	0.1	0	0.03		0.7	0.1	0.1	1.05
-1496	-1525	4CT1	10YR5/4	29	11.1	79.8	9.1			30.1	49.8	4.3	2.6	1.7	0.4	0.1	0.02	0.05	1.2	0.1	0.1	0.94
-1525	-1554	4CT1	10YR5/4	29	9.7	76.2	14.1			27.6	48.6	2.7	7.1	3.8	0.4	0.1	0.02		0.8	0.1	0.1	1.03
-1554	-1581	4CT2	10YR5/3	27	9.8	63.7	26.5			24.6	39.1	2.9	13.9	8.9	0.8	0.1	0.04		0.8	0.1	0.1	0.95

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-1581	-1607	4CT2	10YR5/3	26	8.6	51.3	40.1			21.4	29.9	3.1	23.7	12.6	0.7	0	0.04		0.6	0.1	0.1	0.88
-1607	-1631	5CT	10YR5/4	24	5.9	33.5	60.6			14.9	18.6	4.2	33.8	21.6	1	0.1	0.01		0.4	0.1	0	0.86
-1631	-1656	5CT	10YR5/4	35	3.6	24.5	71.9			10.8	13.7	4.1	44.2	22.6	1	0	0.03		0.3	0.1	0	1.03
-1656	-1686	6C	10YR7/2	30	0	10.3	89.7			4.6	5.7	4	51.7	32.5	1.5	0.1	0.01		0.1	0.1	0.1	
-1686	-1716	6C	10YR7/2	30	0	7.9	92.1			3.3	4.6	4.7	56.2	29.7	1.5	0	0		0.1	0.1	0.1	
-1716	-1746	6C	10YR7/2	30	0	7.3	92.7			3	4.3	6.8	54.7	29.9	1.3	0.1	0.02		0.1	0.1	0.1	
										unnamed alluvium												
-1746	-1756	6BT	7.5YR5/4	10	7.8	13.9	78.3	3.9		5.8	8.1	5.7	46.9	24.3	1.1	0.3	0.02	0.04	0.5	0.1	0.1	0.51
-1756	-1783	7BT1	7.5YR4/6	27	13.1	26.3	60.6			9.5	16.8	3.9	36.4	19.2	0.8	0.3	0.03		1	0.1	0.1	0.47
-1783	-1810	7BT1	7.5YR4/6	27	14.5	28.9	56.6	10.5		10.2	18.7	3.9	27.7	21.4	2.4	1.2	0.03		1.7	0.1	0.1	0.5
-1810	-1851	7BT2	5YR5/8	41	14.6	13.4	72			4.7	8.7	4.2	37.6	19.1	5.8	5.3	0.03		2.3	0.2	0.1	0.47
										Pliocene(?) and (or) Pleistocene sand and gravel												
-1851	-1881	8BC	5YR5/6	30	10.4	5.4	84.2	8.6		1.5	3.9	2.6	50.4	30.6	0.6	0.1	0.03		0.6	0.1	0.1	0.46

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Peoria Loess																					
281	0.81	31	12.6	0.1	0.2	43.8			8.1	540.7	17	7.9	7.4	7.1			1.48			8.8	5.1
245	0.64	21	15.2	0	0.1	36.3			9.1	398.9	12.8	7.8	7.3	7			1.5	1.53	28.8		5.8
202	0.65	20.5	16.8	0	0.2	37.5			8.4	446.4	17.9	7.8	7.3	6.9						10.8	5.7
159	0.7	21	17.9	0.4	0.1	39.4			7.8	505.1	21.5	7.8	7.3	7							5.2
115	0.65	20.4	17.1	0	0.1	37.6			7.9	475.9	20.2	7.8	7.3	6.9			1.48	1.55	29.5	9.8	5
90	0.67	18.6	5.4	0	0.1	24.1			8.1	297.5	19	7.8	7.3	7							5.6
65	0.61	19.6	16.4	0	0.1	36.1			9.4	384	14.3	7.8	7.2	6.8							6.5
35	0.58	19.4	16.3	0.1	0.2	36			10.9	330.3	8.2	7.8	7.2	6.8			1.43	1.49	32	13.2	7.3
Roxana Silt																					
0	0.6	15.4	10.9	0.1	0.4	26.8	1.5		12.5	214.4	2.4	8.1	7.4	6.7						15.7	8.8
-17	0.59	11	5.6	0.2	0.5	17.3	2.1	19.4	14.6	118.5		7.9	7.2	6.4						15.6	9.7
-43	0.54	10.9	5.1	0.2	0.3	16.5	1.9	18.4	14.4	114.6		7.9	7.1	6.3						14.6	8.8
-62	0.55	10.8	4.6	0.1	0.4	15.9	2	17.9	13.9	114.4		7.8	7	6.3			1.42	1.53	29.7	14.1	8.4
-85	0.62	9.8	4.4	0.1	0.3	14.6	1.6	16.2	12.8	114.1		7.9	7.1	6.3						14.5	9
-96	0.69	9.3	4.1	0.1	0.3	13.8	1.6	15.4	12	115		7.9	7.1	6.3						13.2	9.2
-140	0.67	9.7	4.4	0.1	0.4	14.6	2.5	17.1	12.8	114.1		7.8	7	6.3						13.9	9.3
-184	0.66	9.7	4.6	0.1	0.3	14.7	1.8	16.5	13.1	112.2		7.8	7	6.3			1.44	1.53	29.1	13.8	9.3
-218	0.61	9.3	4.4	0.1	0.4	14.2	1.8	16	12.7	111.8		7.8	7	6.3						13.7	8.6
-252	0.64	9	4.2	0.1	0.3	13.6	1	14.6	12.1	112.4		7.9	7.1	6.3						13.3	8.7
-285	0.64	8.1	3.9	0.1	0.3	12.4	0.8	13.2	11.1	111.7		7.8	7	6.2			1.46	1.56	28.3	12.8	8.2
-322	0.73	7.6	3.6	0.1	0.2	11.5	1	12.5	9.9	116.2		7.8	7	6.2						11.5	7.6

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-359	0.64	8.3	3.9	0.1	0.5	12.8	1.6	14.4	11	116.4		7.7	7	6.2	29	8				12.8	8.2
-387	0.62	8.4	4	0.1	0.3	12.8	1.4	14.2	11.4	112.3		7.8	7	6.2						13.7	8.8
-415	0.61	8.5	4.1	0.1	0.3	13	1.2	14.2	11.6	112.1		7.8	7	6.2			1.43	1.51	30	14.2	9.4
-454	0.59	8.6	4.2	0.1	0.3	13.2	1.6	14.8	11.4	115.8		7.7	7	6.2	46	28					9.2
-493	0.62	8.9	4.8	0.3	0.3	14.3	1.9	16.2	13.1	109.2		7.6	6.9	6.3						12.1	9.8
-532	0.59	8.8	4.6	0.1	0.3	13.8	1.5	15.3	12.5	110.4		7.5	6.9	6.3	37	18				14.5	9.9
-568	0.58	9.2	4.8	0.1	0.3	14.4	1.4	15.8	12.6	114.3		7.6	6.9	6.3							10.4
-594	0.54	8.8	4.8	0.1	0.3	13.9	1.6	15.5	12.1	114.9		7.6	6.9	6.4	24	10				15	10.6
Loveland Loess																					
-623	0.54	8.9	5	0.1	0.3	14.2	1.8	16	11.9	119.3		7.6	6.9	6.4						16.6	12
-656	0.54	11.4	6.8	0.1	0.2	18.5	2.3	20.7	16.2	114.2		7.7	7	6.4	39	22	1.55	1.69	26.5	20.9	16.1
-680	0.53	11.1	7	0	0.2	18.3	2.9	21.2	12.2	150		7.7	7	6.4							16.8
-703	0.59	10	6.7	0	0.3	17	2.3	19.3	15	113.3		7.6	7	6.4	36	18				19.3	15
-732	0.55	9.4	6.6	0.1	0.1	16.1	5	21.1	14.2	113.4	0.1	7.6	7	6.4							14.2
-761	0.57	8.6	8.8	0.1	0.1	17.6	2.5	20.1	13.6	129.4		7.6	7	6.4						18.3	13.4
-796	0.64	8.4	6.3	0.1	0.1	14.8	1.6	16.3	13	113.8		7.6	7	6.4							12.3
-820	0.63	8.3	6.3	0	0.1	14.7	1.8	16.5	12.9	114		7.6	7	6.3						16.1	11.4
-843	0.6	7.6	6	0.4	0.2	14.2	1.5	15.7	12.2	116.4		7.5	6.9	6.2						15	10
-877	0.67	7.2	5.7	0.1	0.2	13.2	1.2	14.4	11.8	111.9		7.4	6.8	6.2							10.3
-911	0.59	7.3	6.2	0.1	0.3	13.9	1.4	15.3	12.3	113		7.5	6.9	6.2						14.8	9.6

Table 3. Data from Phillips Bayou quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	ratio/ clay 15 bar 8D1	NH4OAC extr. Ca meq/ 100g 5B5a 6N2e	NH4OAC extr. Mg meq/ 100g 5B5a 6O2d	NH4OAC extr. Na meq/ 100g 5B5a 6P2b	NH4OAC extr. K meq/ 100g 5B5a 6Q2b	NH4OAC extr. Sum Bases meq/ 100g	acidity meq/ 100g 6H5a	CEC Sum Cats meq/ 100g 5A3a	CEC (NH4OAC) meq/ 100g 5A8b	Base Sat (NH4OAC) meq/ 100g 5C1	CO3 as CaCO3 pct<2 mm 6E1g	pH H2O 8C1f	pH CaCl2 .01M 8C1f	pH KCL 1N 8C1g	Atter-berg limits LLpct <0.4mm 4F1	Atter-berg limits PI pct <0.4mm 4F	bulk density 1/3 bar g/cc 4A1d	bulk density oven dry g/cc 4A1h	water content 1/3 bar pct of <2mm 4B1c	water content 2bar pct of <2mm 4B1a	water content 15bar pct of <2mm 4B2a
-946	0.67	6.6	5.8	0.1	0.1	12.6	1	13.6	11.3	111.5		7.5	6.9	6.2							8.9
-977	0.69	6.7	6.1	0.1	0.3	13.2	1.6	14.8	11.8	111.9		7.4	6.8	6.1						14.1	9.5
-1008	0.79	5.9	5.2	0.1	0.2	11.4	1.1	12.5	10.3	110.7		7.4	6.8	6.1							8.7
-1039	0.69	5.9	5.3	0.1	0.2	11.4	1	12.4	10.3	110.7		7.4	6.8	6						12.5	8.3
-1069	0.92	5.4	4.6	0.1	0.2	10.2	1.3	11.5	9	113.3		7.3	6.7	6.1							7.8
-1099	0.82	5.5	4.6	0	0.1	10.2	1.3	11.5	9	113.3		7.4	6.8	6.1						11.6	7.5
-1128	0.67	6.3	5.4	0	0.2	11.9	0.5	12.4	10.9	109.2		7.4	6.8	5.9							7.6
-1155	0.68	6.4	5.5	0.1	0.1	12.1	1.1	13.2	11.1	109		7.5	6.8	5.9						12.4	7.6
-1182	0.65	6.4	5.5	0.2	0.3	12.4	1.1	13.5	11.3	109.7		7.3	6.7	5.7			1.41	1.63	31.8		7.7
-1209	0.6	6.7	5.7	0.2	0.4	13	2	15	11.5	113		7.3	6.7	5.8						12.4	8
-1236	0.63	6.8	5.7	0.2	0.3	13	0.7	13.7	11.4	114		7.4	6.7	5.8							8.4
-1266	0.61	6.8	5.6	0.2	0.3	12.9	1.2	14.1	11.5	112.2		7.4	6.8							12.3	7.9
-1295	0.59	7.4	6.1	0.2	0.3	14	0.1	14.1	12.5	112		7.5	6.9	6.1							8.5
-1325	0.7	7.7	6.3	0.3	0.3	14.6	0.3	14.9	12.4	117.7		7.5	6.9	6						13	8.7
-1355	0.68	7.4	5.8	0.2	0.2	13.6	0.5	14.1	12.5	108.8		7.5	6.9	6							8.4
Crowleys Ridge Loess																					
-1386	0.72	6.7	6	0.3	0.1	13.1	1	14.1	10.6	123.6		7.5	6.9	6.2							7.3
-1423	0.7	6.9	5.1	0.2	0.2	12.4	0.3	12.7	11.1	111.7		7.5	6.9	6.1						12.1	7.4
-1459	0.68	7.2	5.4	0.2	0.2	13	0	13	11.1	117.1		7.6	7								7.2
-1496	0.68	7.1	5.2	0.2	0.1	12.6	0.5	13.1	10.4	121.2		7.6	7	6.4						12	7.6
-1525	0.68	6.7	4.9	0.2	0.2	12	0.1	12.1	10	120		7.6	7	6.4							6.6
-1554	0.67	6.2	4.5	0.2	0.3	11.2	0.3	11.5	9.3	120.4		7.6	7.1	6.5							6.6

Table 3. Data from Phillips Bayou quarry cut-face, south end of Crowleys Ridge, Southeastern Arkansas

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horiz. top (cm)	ratio/ clay 15 bar 8D1	NH4OAC extr. Ca meq/ 100g 5B5a 6N2e	NH4OAC extr. Mg meq/ 100g 5B5a 6O2d	NH4OAC extr. Na meq/ 100g 5B5a 6P2b	NH4OAC extr. K meq/ 100g 5B5a 6Q2b	NH4OAC extr. Sum Bases meq/ 100g	acidity meq/ 100g 6H5a	CEC Sum Cats meq/ 100g 5A3a	CEC (NH4OAC) meq/ 100g 5A8b	Base Sat (NH4OAC) meq/ 100g 5C1	CO3 as CaCO3 pct<2 mm 6E1g	pH H2O 8C1f	pH CaCl2 .01M 8C1f	pH KCL 1N 8C1g	Atter-berg limits LLpct <0.4mm 4F1	Atter-berg limits PI pct <0.4mm 4F	bulk density 1/3 bar g/cc 4A1d	bulk density oven dry g/cc 4A1h	water content 1/3 bar pct of <2mm 4B1c	water content 2bar pct of <2mm 4B1a	water content 15bar pct of <2mm 4B2a
-1581	0.58	5.2	3.6	0.2	0.2	9.2	0	9.2	7.6	121.1	0.1	7.7	7.1	6.5			1.65	1.67	22.1	9	5
-1607	0.54	3.7	2.4	0.2	0.2	6.5	1.3	7.8	5.1	127.5		7.6	6.9	6.4							3.2
-1631	0.78	2.9	1.8	0.2	0.1	5	0.6	5.6	3.7	135.1		7.4	6.7	6.3						4.7	2.8
-1656		1.5	0.5	0.1	0.1	2.1	0	2.1	1.3	161.5		7.1	6.5	6.1							1.1
-1686		1.4	0.5	0.1	0	1.9	1	2.9	1	190		6.9	6.3	5.9						1.5	0.8
-1716		1.4	0.5	0.1	0.1	2	0.1	2.1	1.2	166.7		7	6.4	6.2							0.8
unnamed alluvium																					
-1746	0.53	3.4	1.7	0.4	0.1	5.6	0.6	6.2	4	140		7.6	7	6.6						6.4	4.1
-1756	0.52	4.6	2.8	0.1	0.2	7.6	1	8.6	6.1	124.6		7.5	6.9	6.6			1.76	1.83	14.9		6.8
-1783	0.52	5.2	3	0.1	0.2	8.5	1	9.5	7.2	118.1		7.4	6.8	6.5						10.3	7.6
-1810	0.5	5.1	3	0	0.2	8.3	0.5	8.8	6.9	120.3		7.5	6.9	6.6							7.3
Pliocene (?) and (or) Pleistocene sand and gravel																					
-1851	0.47	3.6	2	0.1	0.1	5.7	1.2	6.9	4.8	118.8		7.4	6.8	6.5						6.5	4.9

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horiz. top (cm)	air dry:oven dry	fs (0.1-0.25mm) mineralogy (optical) grain count in pct 7B1a	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
			Peoria Loess				
281	1.008			MT 3MI 2KK 2CL 1QZ 1	15	11.4	1.4
245	1.009						
202	1.007		QZ44 DL22 FK18 HN5 OW5 FP4 MS1 OP1 PR1 MI1 ZRtr BTtr FCtr TMtr GNtr CLtr FEtr POtr	MT 4MI 2KK 2MM 1QZ 1	11	10.7	1.6
159	1.008						
115	1.008						
90	1.007						
65	1.01						
35	1.01		QZ46 FK19 DL11 OW8 FP6 PR3 OP2 HN2 MS1 ZRtr MItr GNtr FCtr AMtr TMtr POtr BTtr	MT 4KK 3MI 2VR 2QZ 1	16	10.6	1.9
			Roxana Silt				
0	1.013						
-17	1.015		QZ55 FK30 OW7 AM3 FP2 PR1 OP1 MS1 GStr MItr FCtr GNtr FEtr POtr BTtr TMtr ZRtr	MT 3KK 3MI 2MM 1QZ 1	17	10.3	1.5
-43	1.014						
-62	1.013						
-85	1.013		QZ58 FK28 FP4 AM3 OW3 PR1 MS1 OP1 MItr POtr ZRtr GNtr TMtr GStr CLtr	MT 4KK 3MI 2MM 1QZ 1	18	8.9	1.6
-96	1.013						
-140	1.014						
-184	1.013		QZ52 FK28 AM6 OW5 FP3 PR2 MS2 OP1 MI1 ZRtr FEtr TMtr GNtr BTtr CLtr FCtr	MT 3VR 3KK 3MI 2QZ 1	17	10.2	1.3
-218	1.013						
-252	1.013						
-285	1.011						
-322	1.01						

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horiz. top (cm)	air dry:oven dry	fs (0.1-0.25mm) mineralogy (optical) grain count in pct 7B1a	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
-359	1.012		QZ53 FK27 FP7 OW6 AM3 OP2 MS1 PR1 MItr FEtr GNtr ZRtr POtr BTtr TMtr	MT 3KK 3MI 2VR 2QZ 1	19	10.3	1.5
-387	1.011						
-415	1.012						
-454	1.012						
-493	1.012		QZ59 FK29 OW5 AM4 FP3 PR3 MI1 OP1 MStr TMtr ZRtr CLtr GStr FCtr FEtr GNtr BTtr	MT 3KK 3VR 2MI 2MM 1 QZ 1	21	10.3	1.5
-532	1.012		QZ55 FK32 OW3 OP3 FP3 AM2 PR1 MS1 ZRtr BTtr MItr GNtr CLtr TMtr FWtr	MT 3KK 3VR 2MI 2MM 1 QZ 1	21	9.9	1.5
-568	1.013						
-594	1.013		QZ62 FK23 OW6 FP4 MS1 OP1 AM1 PR1 FWtr MItr BTtr GNtr POtr GStr TMtr FCtr ZRtr	MT 3KK 3MI 2VR 2QZ 1GE 1	23	10.7	1.4
			Loveland Loess				
-623	1.014						
-656	1.018			KK 3MT 2MI 2GE 2VR 1HE 1QZ 1	26	11	1.2
-680	1.019						
-703	1.017						
-732	1.017						
-761	1.017						
-796	1.015						
-820	1.016		QZ59 FK21 OW9 FP4 AM2 MS2 OP1 PR1 MItr FEtr ZRtr BTtr TMtr GStr	KK 3VR 2MT 2MI 2GE 2QZ 1	24	10.7	1
-843	1.013		QZ64 FK22 FP7 MS1 OP1 BT1 MI1 FE1 PR1 AMtr TMtr GStr ZRtr CDtr FCtr	KK 3VR 2MT 2MI 1QZ 1	21	10.6	0.9
-877	1.012						
-911	1.014						

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horiz. top (cm)	air dry:oven dry	fs (0.1-0.25mm) mineralogy (optical) grain count in pct 7B1a	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
-946	1.013						
-977	1.013		QZ55 FK29 OW9 FP3 OP2 AM1 BT1 MStr GStr MItr TMtr FCtr ZRtr GNtr FEtr	MT 3MI 2KK 2GE 1QZ 1	26	11	1.3
-1008	1.009						
-1039	1.012						
-1069	1.009		QZ54 FK28 FP7 OP3 OW3 AM2 FE1 PR1 MI1 MS1 CLtr BTtr ZRtr TMtr GStr	MI 2KK 2VR 2MT 1GE 1	17	11.4	1.3
-1099	1.009						
-1128	1.011						
-1155	1.01						
-1182	1.011		QZ56 FK31 FP3 OW3 AM2 OP1 PR1 FE1 MItr MStr ZRtr BTtr FCtr TMtr GStr	MT 3MI 2VR 2KK 2MM 1	19	9	1.4
-1209	1.012						
-1236	1.012		QZ58 FK31 FP4 OW2 OP2 PR1 ZR1 AMtr MStr MItr FEtr GStr CLtr TMtr	MT 3KK 2MI 2VR 2MM 1QZ 1	20	9.6	1.3
-1266	1.011						
-1295	1.012						
-1325	1.013		QZ54 FK25 OW9 FP6 OP2 PR1 AM1 CL1 MItr MStr ZRtr BTtr GStr TMtr CDtr	MT 3VR 2KK 2MI 2QZ 1	19	9.2	1.2
-1355	1.012						
			Crowleys Ridge Loess				
-1386	1.012		QZ56 FK26 OW7 FP5 AM3 OP2 MS1 MI1 PRtr FEtr CLtr BTtr CDtr FCtr GNtr ZRtr	MT 3VR 2MI 2KK 2QZ 1	16	11.3	1.5
-1423	1.011						
-1459	1.011						
-1496	1.011			MT 3VR 2MI 2KK 2GE 1QZ 1	15	12	1.4
-1525	1.009						
-1554	1.01						

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horiz. top (cm)	air dry:oven dry	fs (0.1-0.25mm) mineralogy (optical) grain count in pct 7B1a	csi (0.02-0.05mm) mineralogy (optical) grain count in pct 7B1a	total clay (<.002mm) mineralogy x-ray diffraction 7A2i	elemental Al2O3 pct of <.002mm 7C3	elemental Fe2O3 pct of <.002mm 7C3	elemental K20 pct of <.002mm 7C3
-1581	1.008			KK 3MT 2VR 2MI 2QZ 1	17	9.3	1.3
-1607	1.005						
-1631	1.004	QZ77 FK11 OW8 FP3 QI1 FC1 FEtr		VR 3KK 3MI 2VM 1	14	7.6	1.1
-1656	1.001						
-1686	1			KK 2MI 1CL 1QZ 1	3.9	3.3	0.3
-1716	1.001						
			unnamed alluvium				
-1746	1.004	QZ71 FK12 FP10 OW5 FC1 QI1 FEtr		KK 4MI 2VR 2MT 2QZ 1	21	7.1	1.1
-1756	1.007						
-1783	1.009	QZ79 FK10 FP8 OW2 CD1 FEtr QItr FCtr		KK 4MI 2	23	9.4	0.7
-1810	1.009						
			Pliocene(?) and (or) Pleistocene sand and gravel				
-1851	1.006	QZ67 FP21 FK5 OW4 QI1 FE1 FCtr PRtr MItr		KK 3MT 2VR 1MI 1QZ 1	22	7.7	0.6