



Geologic maps and structure sections of the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz Counties, California

By Z.C. Valin¹, C.M. Wentworth¹, J.L. Minnick¹, T.E. May¹, C.R. Randolph¹,
Lisa Gerhardt¹, C.E. Nelson¹, Patrick Showalter¹, and T.A. Lindquist¹

Digital Publication and Database Description to accompany
Miscellaneous Field Studies Map MF-2373

2001

U.S. Department of the Interior
U.S. Geological Survey

¹U.S. Geological Survey, 345 Middlefield Rd., Menlo Park, CA 94025

Contents

Introduction	3
For those who don't use digital geologic map databases	3
MF2373 Digital Contents	3
Postscript plotfile package	3
PDF plotfile package	4
Digital database package	5
TAR files	8
Postscript plotfiles	9
PDF plotfiles	9
Obtaining the Digital Database and Plotfile Packages	9
To obtain tar files of database or plotfile packages from the USGS web pages	10
To obtain tar files of database or plotfile packages on tape	10
Obtaining plots from a commercial vendor	10
Obtaining plots from USGS	11
Revisions and version numbers	11
Digital database format	11
Converting ARC export files	11
Digital compilation	11
Base maps	12
Spatial resolution	12
Database specifics	12
Lines	13
Areas	14
Points	15
Acknowledgements	16
References Cited	17

Introduction

This pamphlet serves to introduce and describe the digital files that are included in this publication, available for downloading at <http://geopubs.wr.usgs.gov>. These data include both a set of Arc/Info geospatial databases containing the geologic information and Adobe Acrobat PDF and PostScript plot files containing images of the geologic map sheets and explanation sheets, as well as the accompanying text describing the geology of the area. For those solely interested in a paper plot of the map and explanation sheets, please see the section entitled "For Those Who Don't Use Digital Geologic Map Databases" below.

This digital map publication, compiled from previously published and unpublished data and new mapping by the authors, represents the general distribution of bedrock and surficial deposits in the southwestern Santa Clara Valley and southern Santa Cruz Mountains. Together with the accompanying geologic explanation pamphlet (available as `scvmf.txt`, `scvmf.pdf`, `scvmf.ps`), it provides current information on the geologic structure and stratigraphy of the area covered. The database delineates map units that are identified by general age and lithology following the stratigraphic nomenclature of the U.S. Geological Survey. The scale of the source maps limits the spatial resolution (scale) of the database to 1:24,000 or smaller. The content and character of the digital publication, as well as methods of obtaining the digital files, are described below.

For those who don't use digital geologic map databases

For those interested in the geology of this area who do not use an ARC/INFO compatible Geographic Information System (GIS), we have provided two sets of plotfiles containing images of much of the information in the database. Each set contains images of five geologic map sheets, one explanation sheet, two cross-section sheets, and two explanatory pamphlets (one geologic explanation, and this pamphlet also.) There is a set of images in PostScript format and another in Adobe Acrobat PDF format (see the sections "PostScript plot files" and "PDF plot files" below).

Those interested who have computer capability can access the plot file packages in either of the two ways described below (see the section "Obtaining the digital database and plotfile packages"). However, it should be noted the plot file packages do require `gzip` and `tar` utilities to access the plot files. Therefore additional software, available free on the Internet, may be required to use the plot files (see section "Tar files"). In addition, the map and explanation sheets are large, and require large-format color plotters to produce a plot of the entire image, although smaller plotters can be used to plot portions of the images using the PDF plot files (see the sections "PostScript plot files" and "PDF plot files" below).

Those without computer capability can obtain plots of the map files through USGS Map-On-Demand service for digital geologic maps (see section "Obtaining plots from USGS") or from an outside vendor (see section "Obtaining plots from an outside vendor").

Also, USGS has adopted version numbers for publications, similar to that used in the computer industry. Therefore, this publication may be revised and upgraded from time to time. See the section "Revisions and version numbers" for details on this new policy.

MF-2373 digital contents

This publication includes three digital packages. The first is the PostScript Plotfile Package, which consists of PostScript plot files of five geologic maps, one explanation sheet, two cross-section sheets, and a geologic description (pamphlet). The second is the PDF Plotfile Package, and contains the same plotfiles as the first package, but in Portable Document Format (PDF). The third is the Digital Database Package, and contains the geologic map database itself, and the supporting data, including base map coverages, map explanation files, geologic description files, and references.

Postscript plotfile package

This package contains the images described here in PostScript format (see below for more information on PostScript plot files):

<code>lgmap.ps</code>	A PostScript plottable file containing an image of the geologic map and base maps of the Los Gatos quadrangle at a scale of 1:24,000 (Sheet 1).
<code>lrmmap.ps</code>	A PostScript plottable file containing an image of the geologic map and base maps of the Laurel quadrangle at a scale of 1:24,000 (Sheet 2).
<code>lpmap.ps</code>	A PostScript plottable file containing an image of the geologic map and base maps of the Loma Prieta quadrangle at a scale of 1:24,000 (Sheet 3).

sth-mhmap.ps	A PostScript plottable file containing an image of the geologic maps and base maps of the Santa Teresa Hills and southwestern part of the Morgan Hill quadrangles at a scale of 1:24,000 (Sheet 4).
mm-glmap.ps	A PostScript plottable file containing an image of the geologic maps and base maps of the Mt. Madonna and southwestern part of the Gilroy quadrangles at a scale of 1:24,000 (Sheet 5).
scvexpl.ps	A PostScript plottable file containing an image of the map keys, index maps, and map units for the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz Counties, California (Sheet 6).
scvxsec1.ps	A PostScript plottable file containing an image of five cross sections for the Los Gatos and Santa Teresa Hills quadrangles (Sheet 7).
scvxsec2.ps	A PostScript plottable file containing an image of four cross sections for the Laurel and Loma Prieta quadrangles (Sheet 8).
scvmf.ps	A PostScript plottable file of a report containing detailed unit descriptions and geological information, plus sources of data, and references cited.
scvmfdb.ps	A PostScript plottable file of a report describing the digital content of the publication (this pamphlet).

PDF plotfile package

This package contains the images described here in PDF format (see below for more information on PDF plot files):

lgmap.pdf	A PDF plottable file containing an image of the entire geologic map and base maps of the Los Gatos quadrangle at a scale of 1:24,000 (Sheet 1).
lrmap.pdf	A PDF plottable file containing an image of the geologic map and base maps of the Laurel quadrangle at a scale of 1:24,000 (Sheet 2).
lpmap.pdf	A PDF plottable file containing an image of the geologic map and base maps of the Loma Prieta quadrangle at a scale of 1:24,000 (Sheet 3).
sth-mhmap.pdf	A PDF plottable file containing an image of the geologic maps and base maps of the Santa Teresa Hills and southwestern part of the Morgan Hill quadrangles at a scale of 1:24,000 (Sheet 4).
mm-glmap.pdf	A PDF plottable file containing an image of the geologic maps and base maps of Mt. Madonna and southwestern part of the Gilroy quadrangles at a scale of 1:24,000 (Sheet 5).
scvexpl.pdf	A PDF plottable file containing an image of the map keys, index maps, and map units for the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz Counties, California (Sheet 6).
scvxsec1.pdf	A PDF plottable file containing an image of five cross sections for the Los Gatos and Santa Teresa Hills quadrangles (Sheet 7).
scvxsec2.pdf	A PDF plottable file containing an image of four cross sections for the Laurel and Loma Prieta quadrangles (Sheet 8).
scvmf.pdf	A PDF plottable file of a report containing detailed unit descriptions and geological information, plus sources of data, and references.
scvmfdb.pdf	A PDF plottable file of a report describing the digital content of the publication (this pamphlet).

Digital database package

The database package includes geologic map database files for the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz Counties, California. The digital maps, or coverages, along with their associated INFO directory have been converted to uncompressed ARC/INFO export files. ARC export files promote ease of data handling, and are usable by some Geographic Information Systems in addition to ARC/INFO (see below for a discussion of working with export files). The ARC export files and the associated ARC/INFO coverages and directories, as well as the additional digital material included in the database, are described below:

ARC/INFO export file -----	Resultant Coverage -----	Description of Coverage -----
gl-geo.e00	gl-geo/	Faults, depositional contacts, and rock units in the southwestern part of the Gilroy quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
lg-geo.e00	lg-geo/	Faults, depositional contacts, and rock units in the Los Gatos quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
lp-geo.e00	lp-geo/	Faults, depositional contacts, and rock units in the Loma Prieta quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
lr-geo.e00	lr-geo/	Faults, depositional contacts, and rock units in the Laurel quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
mh-geo.e00	mh-geo/	Faults, depositional contacts, and rock units in the southwestern part of the Morgan Hill quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
mm-geo.e00	mm-geo/	Faults, depositional contacts, and rock units in the Mt. Madonna quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
sth-geo.e00	sth-geo/	Faults, depositional contacts, and rock units in the Santa Teresa Hills quadrangle at a scale of 1:24,000. This coverage includes arcs, polygons, and annotation.
gl-str.e00	gl-str/	Strike and dip information and fold axes in the southwestern part of the Gilroy quadrangle at a scale of 1:24,000. This coverage includes arcs, points, and annotation.
lg-str.e00	lg-str/	Strike and dip information and fold axes in the Los Gatos quadrangle at a scale of 1:24,000. This coverage includes arcs, points, and annotation.
lp-str.e00	lp-str/	Strike and dip information and fold axes in the Loma Prieta quadrangle at a scale of 1:24,000. This coverage includes arcs, points, and annotation.
lr-str.e00	lr-str/	Strike and dip information and fold axes in the Laurel quadrangle at a scale of 1:24,000. This coverage includes arcs, points, and annotation.
mh-str.e00	mh-str/	Strike and dip information in the southwestern part of the Morgan Hill quadrangle at a scale of 1:24,000. This coverage includes points and annotation.
mm-str.e00	mm-str/	Strike and dip information and fold axes in the Mt. Madonna quadrangle at a scale of 1:24,000. This coverage includes arcs, points, and annotation.

sth-str.e00 sth-str/ Strike and dip information and fold axes in the Santa Teresa Hills quadrangle at a scale of 1:24,000. This coverage includes arcs, points, and annotation.

The database package also includes the following ARC coverages and files:

ARC/INFO export file -----	Resultant Coverage -----	Description of Coverage -----
gl-cult.e00	gl-cult/	Culture base map for the southwestern part of the Gilroy quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
gl-drain.e00	gl-drain/	Drainage base map for the southwestern part of the Gilroy quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
gl-index.e00	gl-index/	Index contours base map for the southwestern part of the Gilroy quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
gl-inter.e00	gl-inter/	Intermediate contours base map for the southwestern part of the Gilroy quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lg-cult.e00	lg-cult/	Culture base map for the Los Gatos quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lg-drain.e00	lg-drain/	Drainage base map for the Los Gatos quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lg-index.e00	lg-index/	Index contours base map for the Los Gatos quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lg-inter.e00	lg-inter/	Intermediate contours base map for the Los Gatos quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lp-cult.e00	lp-cult/	Culture base map for the Loma Prieta quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lp-drain.e00	lp-drain/	Drainage base map for the Loma Prieta quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lp-index.e00	lp-index/	Index contours base map for the Loma Prieta quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lp-inter.e00	lp-inter/	Intermediate contours base map for the Loma Prieta quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.

lr-cult.e00	lr-cult/	Culture base map for the Laurel quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lr-drain.e00	lr-drain/	Drainage base map for the Laurel quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lr-index.e00	lr-index/	Index contours base map for the Laurel quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
lr-inter.e00	lr-inter/	Intermediate contours base map for the Laurel quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mh-cult.e00	mh-cult/	Culture base map for the southwestern part of the Morgan Hill quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mh-drain.e00	mh-drain/	Drainage base map for the southwestern part of the Morgan Hill quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mh-index.e00	mh-index/	Index contours base map for the southwestern part of the Morgan Hill quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mh-inter.e00	mh-inter/	Intermediate contours base map for the southwestern part of the Morgan Hill quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mm-cult.e00	mm-cult/	Culture base map for the Mt. Madonna quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mm-drain.e00	mm-drain/	Drainage base map for the Mt. Madonna quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mm-index.e00	mm-index/	Index contours base map for the Mt. Madonna quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
mm-inter.e00	mm-inter/	Intermediate contours base map for the Mt. Madonna quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
sth-cult.e00	sth-cult/	Culture base map for the Santa Teresa Hills quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
sth-drain.e00	sth-drain/	Drainage base map for the Santa Teresa Hills quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.
sth-index.e00	sth-index/	Index contours base map for the Santa Teresa Hills quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.

sth-inter.e00 sth-inter/ Intermediate contours base map for the Santa Teresa Hills quadrangle (from 1:24,000 scale original). This coverage contains arcs. There is no database information (AAT) associated with this coverage.

ASCII text files, including explanatory text, PostScript plot files, and an ARC Macro Language file for conversion of ARC export files into ARC coverages:

- scvmf.ps A PostScript plot file of a pamphlet containing detailed unit descriptions and geological information, plus sources of data and references cited.
- scvmfdb.ps A PostScript plot file of a report describing the digital content of the publication (this pamphlet).
- scvmf.pdf A PDF version of scvmf.ps.
- scvmfdb.pdf A PDF version of a report describing the digital content of the publication (this pamphlet).
- scvmf.txt A text-only file containing an unformatted version of scvmf.ps.
- scvmfdb.txt A text-only file of a report describing the digital content of the publication (this pamphlet).
- import.aml ASCII text file in ARC Macro Language to convert ARC export files to ARC coverages in ARC/INFO.
- mf2373.rev.txt A text-only file containing the revisions list for this report.
- mf2373.met.txt A text-only file of FGDC-compliant metadata for this report.

The following supporting directory is not included in the database package, but is produced in the process of reconverting the export files into ARC coverages:

info/ INFO directory containing files supporting the databases.

Tar files

The three data packages described above are stored in tar (UNIX tape archive) files. A tar utility is required to extract the data from the tar file. This utility is included in most UNIX systems, and can be obtained for a variety of platforms free of charge over the Internet from Internet Literacy's Common Internet File Formats Webpage:

(<http://www.matisse.net/files/formats.html>)

The tar files have been compressed, and may be uncompressed with **gzip**, which is available free of charge over the Internet via links from the USGS Public Domain Software page:

(<http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/public.html>)

When the tar file is uncompressed and the data is extracted from the tar file, a directory is produced that contains the data in the package as described above. The specifics of the tar files are listed below:

Name of compressed tar file	Size of compressed tar file (uncompressed)	Directory produced when extracted from tar file	Data package contained
mf2373ps.tgz	21.7MB (83.1GB)	mf2373ps	PostScript Plotfile Package
mf2373pdf.tgz	25.5MB (26.1MB)	mf2373pdf	PDF Plotfile Package

PostScript plot files

For those interested in the geology of the southwestern Santa Clara Valley and southern Santa Cruz Mountains who don't use an ARC/INFO compatible GIS system we have included a separate data package with ten PostScript plot files. Five contain a color plot of the geologic map database at 1:24,000 scale (Sheet 1, Sheet 2, Sheet 3, Sheet 4, Sheet 5, lgmap.ps, lpmap.ps, lrmap.ps, mm-glmap.ps, sth-mhmap.ps). The sixth contains a color plot of the map keys, index maps, and map units (Sheet 6, scvexpl.ps). The seventh and eighth contain cross-sections in the map area (Sheet 7, Sheet 8, scvsec1.ps, scvsec2.ps). In addition, a ninth PostScript file containing the geologic description and discussion is provided (scvmf.ps), and a tenth containing the digital database description (scvmfdb.ps, this document).

The PostScript image of the geologic maps (Sheets 1, 2, 3, 4, 5), map units (Sheet 6), and cross section sheets (Sheet 7, Sheet 8) are up to 52 inches wide by 35 inches high, so it requires a large plotter to produce paper copies at the intended scale. In addition, some plotters, such as those with continual paper feed from a roll, are oriented with the long axis in the vertical direction, so the PostScript image will have to be rotated 90 degrees to fit entirely onto the page. Some plotters and plotter drivers, as well as many graphics software packages, can perform this rotation. The geologic description and database description are both on 8.5 by 11 inch pages.

The PostScript plotfiles for maps were produced by the 'postscript' command in ARC/INFO version 8.0.2. The PostScript plotfiles for pamphlets were produced in Microsoft Word 98 using the Destination PostScript File option from the Print command.

PDF plot files

We have also included a second digital package containing PDF versions of the PostScript map sheets and pamphlet described above. Adobe Reader PDF (Portable Document Format) files are similar to PostScript plot files in that they contain all the information needed to produce a paper copy of a map or pamphlet and they are platform independent. Their principal advantage is that they require less memory to store and are therefore quicker to download from the Internet. In addition, PDF files allow for relatively easy printing of portions of a map image on a printer smaller than that required to print the entire map without the purchase of expensive additional software. All PDF files in this report have been created from PostScript plot files using Adobe Acrobat Distiller. In test plots we have found that paper maps created with PDF files contain almost all the detail of maps created with PostScript plot files. We would, however, recommend that those users with the capability to print the large PostScript plot files use them in preference to the PDF files.

To use PDF files, the user must get and install a copy of Adobe Reader. This software is available free from the Adobe website (<http://www.adobe.com>). Please follow the instructions given at the website to download and install this software. Once installed, the Adobe Reader software contains an on-line manual and tutorial.

There are two ways to use Adobe Reader in conjunction with the Internet. One is to use the PDF reader plug-in with your Internet browser. This allows for interactive viewing of PDF file images within your browser. This is a very handy way to quickly look at PDF files without downloading them to your hard disk. The second way is to download the PDF file to your local hard disk, and then view the file with Adobe Reader. We strongly recommend that large map images be handled by downloading to your hard disk, because viewing them within an Internet browser tends to be very slow.

To print a smaller portion of a PDF map image using Adobe Reader, it is necessary to cut out the portion desired using Adobe Acrobat and the standard cut and paste tools for your platform, and then to paste the portion of the image into a file generated by another software program that can handle images. Most word processors (such as Microsoft Word) will suffice. The new file can then be printed. Image conversion in the cut and paste process, as well as changes in the scale of the map image, may result in loss of image quality. However, test plots have proven adequate. Software designed to handle images (such as Adobe Photoshop or Adobe Illustrator) does a better job.

Obtaining the Digital Database and Plotfile Packages

The digital data can be obtained from <http://pubs.usgs.gov/mf/2002/2373/>

Obtaining plots from a commercial vendor

Those interested in the Geologic maps and structure sections of the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz Counties, California, but who use neither a computer nor the Internet, can still obtain the information. We will provide the PostScript or PDF plot files on digital tape for use by commercial vendors who can make large-format plots. Make sure your vendor is capable of reading Exabyte tape types and PostScript or PDF plot files. Important information regarding tape file format is included in the sections "Tar files," "PostScript plot files," and "PDF plot files" above, so be certain to provide a copy of this document to your vendor.

Obtaining plots from USGS

U.S. Geological Survey provides a map-on-demand service for certain map plot-files, such as those described in this report. To obtain plots of the Geologic maps and structure sections of the southwestern Santa Clara Valley and southern Santa Cruz Mountains, Santa Clara and Santa Cruz Counties, California, the accompanying explanation sheet, and this pamphlet, go to:

http://pubs.er.usgs.gov/#search:advance/page=1/page_size=100/advance=undefined/page_size=100/series_cd=MF/report_number=2373:0

Revisions and version numbers

From time to time, new information and mapping, or other improvements, will be integrated into this publication. Rather than releasing an entirely new publication, the USGS has adopted a policy of using version numbers similar to that used in the computer industry. The original version of all publications will have no version number. Subsequent small revisions will be denoted by the increase of the numeral after the decimal (1.1), while large changes will be denoted by increasing the numeral before the decimal (2.1). Pamphlets and map products will be clearly marked with the appropriate version number. Information about the changes, if any, that have been made since the first release will be listed in the publication revision file. This file will be available at the publication web site (see above), and will also be included in the digital database package. A simplified version of the revision list will be included in the publication metadata.

Digital database format

The databases in this report were compiled in ARC/INFO, a commercial Geographic Information System (Environmental Systems Research Institute, Redlands, California), with version 3.0 of the menu interface ALACARTE (Fitzgibbon and Wentworth, 1991; Fitzgibbon, 1991; Wentworth and Fitzgibbon, 1991). The files are in either GRID (ARC/INFO raster data) format or COVERAGE (ARC/INFO vector data) format. Coverages are stored in uncompressed ARC export format (ARC/INFO version 7.x). ARC/INFO export files (files with the .e00 extension) can be converted into ARC/INFO coverages in ARC/INFO (see below) and can be read by some other Geographic Information Systems, such as MapInfo via ArcLink and ESRI's ArcView (version 1.0 for Windows 3.1 to 3.11 is available for free from ESRI's web site: <http://www.esri.com>). The digital compilation was done in version 7.2.1 of ARC/INFO with version 3.0 of the menu interface ALACARTE (Fitzgibbon and Wentworth, 1991; Fitzgibbon, 1991; Wentworth and Fitzgibbon, 1991).

Converting ARC export files

ARC export files are converted to ARC coverages using the ARC command IMPORT with the option COVER. To ease conversion and maintain naming conventions, we have included an ASCII text file in ARC Macro Language that will convert all of the export files in the database into coverages and create the associated INFO directory. From the ARC command line type:

```
Arc: &run import.aml
```

ARC export files can also be read by some other Geographic Information Systems. Please consult your GIS documentation to see if you can use ARC export files and the procedure to import them.

Digital compilation

The geologic map information was digitized from stable originals of the geologic maps at 1:24,000 scale. The author manuscripts (pencil on mylar) were scanned using a Altek monochrome scanner with a resolution of 800 pixels per inch. The scanned images were vectorized and transformed from scanner coordinates to projection coordinates with digital ties placed

by hand at quadrangle corners. The scanned lines were edited interactively by hand using ALACARTE, and color boundaries were tagged as appropriate, and some scanning artifacts visible at 1:24,000 were removed.

Base maps

Base map layers were prepared by scanning and vectorizing lines from scale-stable versions of USGS topographic maps. The maps used were the Gilroy (1981 photorevised edition), Laurel (1968 photorevised edition), Loma Prieta (1978 photoinspected edition), Los Gatos (1980 photorevised edition), Morgan Hill (1980 photorevised edition), and Santa Teresa Hills (1980 photorevised edition) 1:24,000 scale maps. The maps have a 40 foot contour interval, except for the Gilroy quadrangle, which has a 20 foot contour interval. Scanned and vectorized images were transformed from scanner coordinates to projection coordinates with digital tics placed by hand at map corners. All images were then trimmed interactively by hand using ALACARTE to conform to the area of the geologic coverages.

Spatial resolution

Uses of this digital geologic map should not violate the spatial resolution of the data. Although the digital form of the data removes the constraint imposed by the scale of a paper map, the detail and accuracy inherent in map scale are also present in the digital data. The fact that this database was compiled and edited at a scale of 1:24,000 means that higher resolution information is not present in the dataset. Plotting at scales larger than 1:24,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, where this database is used in combination with other data of higher resolution, the resolution of the combined output will be limited by the lowest resolution of these data.

Database specifics

What follows is a brief and simple description of the databases included in this report and the data in them. For a comprehensive look at the database structure and content, please see the FGDC Metadata file, mf2373.met, included in the database package and available separately at the publication web page.

The map databases consist of ARC coverages and supporting INFO files, which are stored in a Stateplane projection (Table 1). Digital tics define a 2.5-minute grid of latitude and longitude in the geologic coverages corresponding with quadrangle corners and internal tics.

Table 1. Map Projection

The maps are stored in Stateplane projection. The following is an annotated projection file of the type used in Arc/Info.

```
PROJECTION STATEPLANE
UNITS METERS
ZONE 3326
SPHEROID CLARKE1866
PARAMETERS
END
```

The content of the geologic database can be described in terms of the lines and the areas that compose the map. Descriptions of the database fields use the terms explained in Table 2.

Table 2. Field Definition Terms

ITEM NAME	name of the database field (item)
WIDTH	maximum number of digits or characters stored
OUTPUT	output width
TYPE	B-binary integer, F-binary floating point number, I-ASCII integer, C-ASCII character string, N-number with decimal places
N. DEC.	number of decimal places maintained for floating point numbers

Lines

The lines (arcs) are recorded as strings of vectors and are described in the arc attribute table (the format of the arc attribute table is shown in Table 3). They define the boundaries of the map units, the boundaries of open bodies of water, and the map boundaries. These distinctions, including the geologic identities of the unit boundaries, are recorded in the LTYPE field according to the line types listed in Table 4.

Table 3. Content of the Arc Attribute Tables

ITEM NAME	WIDTH	OUTPUT	TYPE	N. DEC	
FNODE#	4	5	B		starting node of arc (from node)
TNODE#	4	5	B		ending node of arc (to node)
LPOLY#	4	5	B		polygon to the left of the arc
RPOLY#	4	5	B		polygon to the right of the arc
LENGTH	4	12	F	3	length of arc in meters
<coverage>#	4	5	B		unique internal control number
<coverage>-ID	4	5	B		unique identification number
LTYPE	35	35	C		line type (see Table 4)

Table 4. Line Types Recorded in the LTYPE Field

gl-geo, lg-geo, lp-geo, lr-geo, mh-geo, mm-geo, sth-geo -----	gl-str, lg-str, lp-str, lr-str, mm-str, sth-str -----
atten. fault, approx. located	f.a., anticline, approx. located
atten. fault, certain	f.a., anticline, certain
atten. fault, concealed	f.a., anticline, concealed
atten. fault, concealed, queried	f.a., anticline, inferred
atten. fault, inferred	f.a., anticline, inferred, queried
atten. fault, inferred, queried	f.a., antiform, certain
atten. fault, inferred, queried_	f.a., antiform, concealed
conglomeratic marker	f.a., antiform, inferred
contact, approx. located	f.a., antiform, inferred, queried
contact, certain	f.a., ot anticline, approx. located
contact, concealed	f.a., ot anticline, concealed
contact, concealed, queried	f.a., ot syncline, certain
contact, inferred	f.a., ot syncline, concealed
contact, inferred, queried	f.a., syncline, approx. located
crack, 10/17/89	f.a., syncline, certain
dam	f.a., syncline, concealed
fault, approx. located	f.a., syncline, concealed, queried
fault, certain	f.a., syncline, inferred
fault, concealed	f.a., syncline, inferred, queried
fault, concealed, queried	
fault, inferred	
fault, inferred, queried	
glauconitic marker	
map boundary	
marker bed	
normal fault, approx. located	
normal fault, certain	
normal fault, concealed	
normal fault, inferred, queried	
photo lineament	
s.s. fault, approx. located	
s.s. fault, certain	
s.s. fault, l.l., certain	
s.s. fault, r.l., approx. located	

s.s. fault, r.l., certain
s.s. fault, r.l., concealed
s.s. fault, r.l., inferred
s.s. fault, r.l., inferred, queried
thrust fault, approx. located
thrust fault, certain
thrust fault, concealed
thrust fault, concealed, queried
thrust fault, inferred
thrust fault, inferred, queried
thrust fault, inferred, queried_
topographic escarpment
water boundary

The geologic line types are ALACARTE line types that correlate with the geologic line symbols in the ALACARTE line set GEOLOGY.LIN according to the ALACARTE lines lookup table. For more information about these line types, as well as information about the line types in the supporting coverages, please see the publication metadata.

Note: This is a complete list of line types contained in the database. Not every line type is present in every coverage.

Areas

Map units (polygons) are described in the polygon attribute table (the format of the polygon attribute table is shown in Table 5). The identities of the map units from compilation sources are recorded in the PTYPE field by map label (Table 6). Map units are described more fully in the accompanying text file ceghmf.ps or ceghmf.pdf. Note that ARC/INFO coverages cannot contain both point and polygon information, so only coverages with polygon information will have a polygon attribute table, and these coverages will not have a point attribute table. For more information about these polygon types, as well as information about the polygon types in the supporting coverages, please see the publication metadata.

Table 5. Content of the Polygon Attribute Tables

ITEM NAME	WIDTH	OUTPUT	TYPE	N. DEC	
AREA	4	12	F	3	area of polygon in square meters
PERIMETER	4	12	F	3	length of perimeter in meters
<coverage>#	4	5	B		unique internal control number
<coverage>-ID	4	5	B		unique identification number
PTYPE	35	35	C		unit label

Table 6. Map unit labels recorded in the PTYPE field in coverages gl-geo, lg-geo, lp-geo, lr-geo, mh-geo, mm-geo, and sth-geo (See the geologic explanation pamphlet for complete descriptions of units).

H20	Kgr	Qhfp
Jdb	Kuc	Qhl
Jog	Kuc?	Qls
Joi	Kus	Qls?
Jos	Kus?	Qmt
Jos?	QTf	Qoa
Jou	QTsc	Qof
Jou?	QTsc?	Qof?
Jov	Qa	Qpf
Jov?	Qad	Qpf?
Jovb	Qaf	Qt
Jsl	Qal	Qt?
Jssp	Qhb	Tbc
Jt	Qhc	Tbm
KJm	Qhc?	Tbs
KJm?	Qhf	Tbu

Tcm	Tst	fm?
Tcm?	Tt	fmc
Tcml	Tt?	fmc?
Tcms	Ttv	fms
Tla	Tus	fms?
Tlm	Tus?	fmv
Tlm?	Tv	fmv?
Tlo	Tv?	fpl
Tls	Tvb	fpt
Tls?	Tvb?	fpv
Tm	Tz	fpv?
Tme	af	gp
Tms	am	md
Tp	bs	mdi
Tp?	cg	pp
Tsc	ch	sc
Tsm	dbc	sc?
Tsm?	dbc?	v
Tsr	dbm	
Tsr?	fm	

Note: This is a complete list of polygon types contained in the database. Not every polygon type is present in every coverage.

Points

Data gathered at a single locality (points) are described in the point attribute table (the format of the point attribute table is shown in Table 7). The identities of the points from compilation sources are recorded in the PTTYPER field (Table 8). Additional information about the points is stored in additional attribute fields as described below and in Table 7. Note that ARC/INFO coverages cannot contain both point and polygon information, so only coverages with point information will have a point attribute table, and these coverages will not have a polygon attribute table. For more information about these point types, as well as information about the point types in the supporting coverages, please see the publication metadata.

Table 7. Content of the Point Attribute Tables

ITEM NAME	WIDTH	OUTPUT	TYPE	N. DEC	
AREA	4	12	F	3	area of polygon in square meters
PERIMETER	4	12	F	3	length of perimeter in meters
<coverage>#	4	5	B		unique internal control number
<coverage>-ID	4	5	B		unique identification number
PTTYPER	35	35	C		unit label
DIP	3	3	I		dip of bedding or foliation (structure coverage only)
STRIKE	3	3	I		strike of bedding or foliation (structure coverage only)

Table 8. Point types recorded in the PTTYPER field in coverages gl-str, lg-str, lp-str, lr-str, mh-str, mm-str, and sth-str

- approx. attitude
- axial trend, small anticline
- axial trend, small anticline_
- axial trend, small syncline
- bedding
- bedding, in trench
- bedding w/tops

complex folds
complex folds_
flat bedding
fold axis dip
foliation
inclined lineation
joint
lava flow attitude w/tops
lava flow or dike attitude
ot bedding
ot bedding w/tops
vert bedding
vert bedding w/tops
vert foliation
vert lava flow or dike or sill

Note: This is a complete list of point types contained in the database. Not every point type is present in every coverage.

The geologic point types in the structure coverage are ALACARTE point types that correlate with the geologic point symbols in the ALACARTE point set GEOLOGY.MRK according to the ALACARTE point lookup table. For more information on ALACARTE and its pointsets, see Wentworth and Fitzgibbon (1991).

Acknowledgments

The geology of this area was mapped by R. J. McLaughlin, J. C. Clark, E. E. Brabb, and E. J. Helley between 1988 and 1996; part of the Mt. Madonna quadrangle was mapped by C. J. Colón from 1991-1992. The geology of the New Almaden area is partly compiled from Bailey and Everhart, 1964. The geology along the San Andreas fault is partly incorporated from Sarna-Wojcicki and others, 1975 and from U. S. Geological Survey Staff, 1989. Other pertinent geologic map data sources are indicated under the heading: *Index to Sources of Data Used in Compilation*.

Numerous scientists within the U.S. Geological Survey and from academia, have contributed to this database:

Critical paleontologic support was provided by: K. McDougall-Reid and Richard Pierce (deceased), Tertiary benthic foraminifers; D. Bukry, Tertiary nannofossils; J. Barron, Tertiary diatoms; C. Powell, W. Addicott, and J. Vedder, Tertiary macrofossils; W. V. Sliter (deceased), Mesozoic foraminifers; B. Murchey, Y. Isozaki, and I. Hattori, Mesozoic radiolaria; and W. Elder and D.L. Jones, Mesozoic macrofossils.

Isotopic data for age and provenance determinations were provided by R. Kistler and D. Champion, Rubidium and Strontium; J. Nakata, D. Sorg and P. Russell, K-Ar and Ar-Ar radiometric ages; and J. Wooden, U-Pb radiometric age.

A fission track age investigation, conducted in the map region in 1992-1994 by T. Dumitru, R. Bürgmann, and Ramon Aerosmith, of Stanford University, in cooperation with the senior author, has contributed substantially to an understanding of the structural history of this area.

The senior author (McLaughlin) also wishes to acknowledge the following scientists for their collaborative and cooperative work, that has strongly influenced interpretations of the geology and crustal structure of the map region: R. Jachens, A. Griscom and V. Langenheim (U.S.G.S.), modeling of gravity and aeromagnetic data; R. Bürgmann (Stanford, now at U.C. Berkeley), geodetic data; C.M. Wentworth and R.G. Stanley (U.S.G.S.), regional geology; R. Wells, D. Ponti, C. Prentice, D. Schwartz, S. Ellen, and K. Schmidt, (all at the U.S.G.S.), and W. Cotton (W. Cotton and Associates), detailed work on surface deformation and active fault relationships following the 1989 Loma Prieta earthquake.

The authors wish to acknowledge the many owners of large land parcels and ranches in rural areas of Santa Clara and Santa Cruz Counties, who have cooperated with these mapping investigations by providing access to their properties and showing interest in the work. We also thank the following private and public agencies for their cooperation in allowing access and gate keys to their properties, including the San Jose Water Company; Mid-Peninsula Open-Space District; and the Santa Clara County Park system.

We also wish to thank the California Division of Forestry, particularly CDF Burrel Fire Station of Santa Cruz County, for providing lodging to the senior author (McLaughlin) in the course of mapping investigations.

This digital database was compiled in ARC/INFO, a commercial G.I.S. (ESRI). The digital compilation was done using the 1996 version 3.0 of the menu interface ALACARTE (originally published as version 1.0 by Fitzgibbon and Wentworth, 1991). The digitization of geologic contacts, development and integration of various data sets into the digital map database were largely supervised by C.M. Wentworth (1988-1997). Numerous individuals have compiled

and edited parts of the digital files for this publication at different times, including T.A. Lindquist (1988), P. Showalter (1989-1990), C.E. Nelson (1994), L. Gerhardt (1996), C.R. Randolph, T.E. May, and J.L. Minnick (1996-1998), and Z.C. Valin (1996-2001). The digital geology was initially compiled as a part of the geologic map database for the San Jose, California 1:100,000-scale quadrangle (Wentworth and others, unpublished, 1999) but the maps are herein released at 1:24,000.

Geologic mapping was at a scale of 1:24,000, which is therefore the scale of maximum resolution. Enlargement of these maps to scales substantially less than 1:24,000 is here considered inappropriate.

Technical reviews of this report were provided by P. Stone (Western Earth Surface Processes Team, U.S.G.S.) and by M.C. Blake, Jr., (Emeritus). R.W. Graymer (Western Earth Surface Processes Team, U.S.G.S.) reviewed the database. Technical editing of this report for publication by the U.S. Geological Survey was provided by J. Zigler, and preparation of the database website was by R. Koch and C. Donlin (all at Western Publications Unit, U.S.G.S.).

References Cited

- Fitzgibbon, T.T., 1991, ALACARTE installation and system manual (version 1.0): U.S. Geological Survey Open-File Report 91-587-B.
- Fitzgibbon, T.T., and Wentworth, C.M., 1991, ALACARTE user interface - AML code and demonstration maps (version 1.0): U.S. Geological Survey Open-File Report 91-587-A.
- Wentworth, C.M., and Fitzgibbon, T.T., 1991, ALACARTE user manual (version 1.0): U.S. Geological Survey Open-File Report 91-587-C.