U.S. DEPARTMENT OF THE INTERIOR
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OPEN-FILE REPORT 03-301

GEOLOGIC MAP AND DIGITAL DATABASE OF THE YUCAIPA 7.5’ QUADRANGLE, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA, v. 1.0

Readme

Geology by

J.C. Matti[1], D.M. Morton[2], B.F. Cox[3], S.E. Carson[3], and T.J. Yetter[3]

Digital preparation by

P.M. Cossette[4], B. Jones[1], M.C. Wright[2], S.A. Kennedy[1], M.L. Dawson[2], and R.M. Hauser[2]

Readme by

P.M. Cossette[4] and J.C. Matti[1]

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[1]U.S. Geological Survey, Tucson, Arizona
[2]U.S. Geological Survey, Riverside, California
[3]U.S. Geological Survey, Menlo Park, California
[4]U.S. Geological Survey, Spokane, Washington

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INTRODUCTION

Open-File Report 03-301 is a digital geologic-map database of the Yucaipa 7.5’ quadrangle prepared by the Southern California Areal Mapping Project (SCAMP), a geologic-mapping project sponsored jointly by the U.S. Geological Survey and the California Geological Survey. The database was created in version 7.1.1 of ARC/INFO (Environmental Systems Research Institute), and includes the following files:

- This readme describing how to access and extract files in the database package
- An FGDC-compliant metadata file (.txt file)
- Geologic-map coverages
- Associated data tables
- A browse graphic of the geologic-map plot and explanatory information (.pdf file)
- A PostScript graphics file of the geologic-map plot and explanatory information
- A .pdf file listing coded geologic attributes stored in the database, including plain-word definitions of each coded attribute
- Pamphlets describing geologic-map units of the Yucaipa quadrangle and their geologic age and geologic history (.pdf files)

DIGITAL COMPILATION

Data capture and editing

The digital geologic-map database was produced from geologic linework drafted on a 1:24,000-scale greenline chronoflex of the Yucaipa 7.5’ quadrangle. Geologic line and point data on the greenline were digitized and simultaneously converted to ARC/INFO coverages through the application and utilization of the graphical user interface ALACARTE developed by the U.S. Geological Survey (Fitzgibbon, 1991; Fitzgibbon and Wentworth, 1991; Wentworth and Fitzgibbon, 1991) running on a Data General Aviion workstation. The database subsequently was edited and tagged on a Sun SPARC20 computer system running Solaris v. 2.4 and ARC/INFO v. 7.0.4 and v. 7.1.1. Geologic point data were converted using ALACARTE around ARC/INFO v.7.0.4.

Digital editors and their contributions

Pamela M. Cossette—Final geologic database editing, and assembling the final database and plot-file products;

Bradley Jones—Significant database editing;

Melinda C. Wright—Geologic-point capture and preliminary database editing;

Stephen A. Kennedy—Preliminary database editing;

Michael L. Dawson—Geologic-line capture and preliminary database editing;

Rachel M. Hauser—Preliminary database editing.

Base Map

A geo-referenced base-map image (**yuc.tif**) was prepared by scanning a scale-stable right-reading blackline .007-mil clear film of the U.S. Geological Survey, 1:24,000-scale Yucaipa 7.5’ quadrangle topographic map (1967, photorevised, 1980). Scanning was done using an Anatech Eagle 4080 monochrome 800 dots-per-inch scanner at a resolution of 500 dpi. The raster scan was converted to a monochromatic image in ARC/INFO. No elements of the base layer are attributed. The base map is provided for reference only.

DATABASE CONTENTS

Database tar file yuc.tar.gz

The Yucaipa geologic-map data files are bundled into a single tar (tape archive) file named **yuc.tar.gz**. The files were compressed with gzip (.gz extension). Instructions for extracting the files are provided below.

The tar file **yuc.tar.gz** contains the following ARC/INFO interchange files (Table 1), a gzip compressed PostScript plot file, a .tif file of the topographic base, and a plain text version of the Yucaipa 7.5’ quadrangle metadata:

ARC/INFO INTERCHANGE FILES	YUCAIPA COVERAGES and DATA FILES	DESCRIPTION
yuc_geo.e00	**yuc_geo**	Coverage containing geologic-map units (geologic features represented as polygons), map-unit labels, geologic contacts and faults (geologic features represented by lines). NOTE: labels for map units and named faults are contained in two annotation sub-classes (**anno.geo** and **anno.fault**)
yuc_pts.e00	**yuc_pts**	Coverage containing quantitative structural-point data (azimuth and dip data for bedding and foliation, plunge data for lineations, etc). Dip and plunge values are plotted as annotation from annotation sub-class anno.dip
yuc_str.e00	**yuc_str**	Coverage containing fold axes
yuc_ptsorn.e00	**yuc_ptsorn**	Coverage containing non-quantitative point data used to ornament or symbolize certain kinds of geologic-line features (fold-axes, faults, etc.)
yuc_obs.e00	**yuc_obs**	Coverage containing the location of observation stations and subsurface-boring locations
yuc_ldr.e00	**yuc_ldr**	Leaders for polygon labels and fault names
lines.rel.e00	**lines.rel**	Line dictionary accessed in the relate environment
points.rel.e00	**points.rel**	Point dictionary accessed in the relate environment
yuc_summ_rel.e00	**yuc_summ.rel**	Data table containing coded geologic attributes for general map-unit features

Table 1. ARC/INFO interchange files in the data package **yuc.tar.gz**

When the Yucaipa interchange .e00 files are imported as ARC coverages into ARC/INFO, an info**/** directory is produced. The Yucaipa info**/** directory will contain the following INFO files (Tables 2, 3) along with the converted symbolsets that are included for the user's convenience:

POLYGON-ATTRIBUTE TABLES
yuc_geo.pat
ARC-ATTRIBUTE TABLES
yuc_geo.aat
yuc_str.aat
yuc_ldr.aat
POINT-ATTRIBUTE TABLES
yuc_pts.pat
yuc_ptsorn.pat
yuc_obs.pat

Table 2. Feature-attribute tables in the Yucaipa info**/** directory

TABLE NAME	CONTAINS
lines.rel	Line dictionary, contains all SCAMP line codes and their explanations
points.rel	Point dictionary, contains all SCAMP point codes and their explanations
yuc_summ.rel	Contains geologic-summary information for polygons

Table 3. Data tables in the Yucaipa info**/** directory

Plot files

Once unzipped, **yuc.ps.gz** yields a PostScript file, **yuc.ps,** which will plot a 1:24,000-scale, full-color geologic map of the Yucaipa quadrangle on its topographic base, including a detailed Correlation of Map Units diagram and an abbreviated Description of Map Units. The plot is approximately 36 x 48 inches in size. It has been plotted successfully using Hewlett-Packard large-format plotters, models HP650C, HP755CM, and HP2500C.

Table 4 lists symbolsets and fonts used to prepare plots of the geologic map and its legend. Most of the files are contained in the **yuc.tar.gz** data package. Others can be accessed from web sites as indicated in Table 4.

FILE NAME	DESCRIPTION
geoscamp2.lin	Geologic-line symbolset scamp.wr.usgs.gov/scamp/html/sc_gis.html
geoscamp2.mrk	Geologic-point symbolset scamp.wr.usgs.gov/scamp/html/sc_gis.html
scamp2.shd	Color shadeset
geology2.shd	Pattern shadeset

Table 4. Marker-set, line-set, and shade-set files used to display the Yucaipa quadrangle map and its legend.

Raster Files

RASTER FILE	RASTER IMAGE	CONTAINS
yuc.tif	Yucaipa 7.5’ basemap	Topographic base (monochromatic)

Table 5. Image of Yucaipa topographic base included in data package.

PDF Files

Several Portable Document Format (.pdf) files (Table 6) are included in the Yucaipa data package and are intended to provide the user with information about particular features contained in the database, and how to access them. These files include a browse graphic that, although large and slow to download, allows the user to examine the Yucaipa geologic-map plot and its legend.

FILE NAME	DESCRIPTION
yuc_readme.pdf	This document
yuc_attribute_codes.pdf	Document listing geologic-attribute codes and their explanations
yuc_pamphlet.pdf	Pamphlet describing the geologic setting and geologic history of materials and structures in the Yucaipa quadrangle
yuc_map.pdf	Browse graphic of Yucaipa geologic map and legend (pdf format)
yuc_dmu.pdf	Description of Map Units

Table 6. Portable Document Format (.pdf) files describing the Yucaipa database.

HOW TO OBTAIN THE DIGITAL FILES

The interchange (.e00) files for the Yucaipa geologic-map database may be obtained over the Internet at the following: http://geopubs.wr.usgs.gov/open-file/of03-301

Be sure to use binary transfer mode.

HOW TO EXTRACT THE GEOLOGIC MAP DATABASE FROM THE TAR FILE yuc.tar.gz

Extracting the database files

After the files are downloaded, they must be uncompressed using a gzip utility such as gzip itself or WinZip available at http://www.winzip.com/. Gzip utilities are available free of charge via the internet through links on the Common Internet File Formats web page (http://www.matisse.net/files/formats.html); also, see the gzip home page http://www.gzip.org.

Once uncompressed, individual data files must be extracted from **yuc.tar** using a tar utility. In the UNIX environment, follow the instructions in Table 7. This process will create a directory (**yuc_of/)** that contains the ARC/INFO interchange files, supporting files, and the info/ directory.

TO DO THIS	TYPE THIS AT THE UNIX COMMAND PROMPT
decompress **yuc.tar.gz** to create tar file named yuc.tar	gzip -d yuc.tar.gz (or use gzip utility of choice)
Go to the directory that will hold the directory yuc_of (if different from local_directory)	cd local_directory
Extract the yuc_of directory from the tar file	tar -xvbv {path to tar file}/yuc.tar (or use tar utility of choice)

Table 7. How to extract files from **yuc.tar.gz**

Accessing the Portable Document Format (.pdf) files

The .pdf files are not stored as gzip files. They are accessed using Adobe Acrobat Reader software, available free of charge from the Adobe website. Follow instructions at the website to download and install the software. Acrobat Reader contains an on-line manual and tutorial.

HOW TO CONVERT THE ARC/INFO INTERCHANGE FILES

The ARC interchange (.e00) files are converted to ARC coverages using the ARC command IMPORT. While in the yuc_of directory, at the ARC prompt, type:

import <option> <interchange_file> <output file>
e.g. import auto yuc_geo yuc_geo

Please consult the Arc/Info Online Help for details on how to use the import and option commands.

ARC interchange files can be read by other Geographic Information Systems, including ArcView (ESRI) and MapInfo (http://www.mapinfo.com/). Please consult your GIS documentation to see if you can use ARC interchange files and follow the appropriate procedure to import them. NOTE: the graphical symbols contained in the two symbolsets “**geoscamp2.lin**” and “**geoscamp2.mrk**” (referenced by the item **L-SYMB** in **yuc_geo.aat** and **yuc_str.aat** and the item P-SYMB in **yuc_pts.pat** and **yuc_ptsorn.pat**) cannot be accessed in ArcView.

ARC/INFO PROJECTION PARAMETERS

The ARC coverages are stored in polyconic projection (Table 8). Four digital tics define the geographic extent of the Yucaipa 7.5’ database.

	DESCRIPTION	
Projection	Polyconic	
Datum	NAD27	
Zunits	No	
Units	Meters	
Spheroid	Clark 1866	
X shift	0.0000000000	
Y shift	0.0000000000	
Parameters	-117º 03’ 45”	longitude of central meridian
	34º 00’ 00”	latitude of projection’s origin
	0.00000	false easting (meters)
	0.00000	false northing (meters)

Table 8. Map-projection parameters

REFERENCES CITED

Environmental Systems Research Institute, Inc, 1991, ARC/INFO command references 6.0: Proprietary software manual

Fitzgibbon, T.T., 1991, ALACARTE installation and system manual (version 1.0): U.S. Geological Survey, Open-File Report 91-587B.

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 91-587A

Wentworth, C.K., 1922, A scale of grade and class terms for clastic sediments: Journal of Geology, v. 30, p. 377-392.

Wentworth, C.M., and Fitzgibbon, T.T., 1991, ALACARTE user manual (version 1.0): U.S. Geological Survey Open-File Report 91-587C.

APPENDIX 1: THE RIGHT-HAND RULE FOR QUANTITATIVE POINTS

The Yucaipa database contains quantitative information collected by the database authors at specific observation stations. These data are referred to as "quantitative point data", are stored in the data table **yuc_pts.pat**, and are displayed on the geologic map image by various symbols like the one in Figure 1. Many of these point data record the orientation of planar geologic features such as sedimentary bedding, fault-plane dip, and metamorphic foliation. For such planar features, the "right-hand rule" is used to avoid ambiguities attendant to how the azimuth or bearing of the strike is recorded relative to the direction in which the planar surface dips, using a 360˚ azimuthal scheme.

Consider a bedding surface that trends due north and is inclined 45˚ to the east (fig. 1). In the field, the geologist can record the strike azimuth (bearing) either as 360˚ or 180˚, so long as the E inclination of the 45˚ dip amount is specified (e.g., 360˚, 45˚E or 180˚, 45˚E). From an analysis point of view, the choice of 360˚ or 180˚ as azimuth doesn't matter, so long as the E direction of the 45˚ dip is indicated. However, if the paired measurements (strike, dip) are recorded only as (360˚, 45˚) or (180˚, 45˚), the direction of dip (E or W) can not be determined from the record.

The "right-hand rule" resolves this dilemma by requiring the azimuth of each planar feature to be recorded so that the dip-direction can be determined from the azimuth alone. Specifically, in the database all planar azimuths are recorded with DIP TO THE RIGHT. For the example cited above, the bedding azimuth would be recorded in the database so that the E dip is implicit—in this case, azimuth of 360˚ with DIP TO THE RIGHT. Figure 1 shows a bedding symbol that represents this geometry. For such an E-tilted layer, an azimuth of 180˚ using the right-hand rule would yield a dip of 45˚ W.

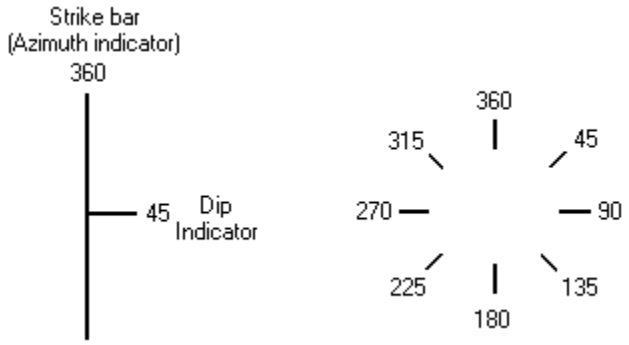

Figure 1.—Diagram illustrating a quantitative-point symbol for sedimentary bedding trending 360˚ and dipping 45˚ in an east direction (the symbol is greatly enlarged from its counterpart in geoscamp2.mrk). The value stored in P-STRIKE of **yuc_pts.pat** must be entered as 360 to conform to the right-hand rule and in order for the 45˚ value in P-DIP to be deciphered as E-dipping. For these values (360, 45), P-DIPDIR in **yuc_pts.pat** would by 090. Also illustrated is a schematic drawing of ordinal values for a 360˚ azimuthal compass.

The Yucaipa database adheres to the right-hand rule. In **yuc_pts.pat** the Item **P-STRIKE** records the azimuth of each planar feature, and the right-hand rule allows the user to decipher the dip direction for the dip value recorded in the Item **P-DIP**. For convenience, **yuc_pts.pat** also contains the Item **P-DIPDIR**, which indicates directly the direction in which each planar feature dips (090, in this example).