Preliminary Digital Geologic Map of the Santa Ana 30´ X 60´ Quadrangle, southern California, version 2.0

Compiled by D.M. Morton[1]

Version 2.0 digital preparation by Kelly R. Bovard[1] and Rachel M. Alvarez[1] – 2004
Version 1.0 digital preparation by Rachel M. Hauser[1] and Kelly R. Ruppert[1] – 1999

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Open-File Report 99-172
Version 2.0 - 2004

SCAMP—Southern California Areal Mapping Project
A geologic-mapping project sponsored jointly by the U.S. Geological Survey and the California Geological Survey

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

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INTRODUCTION

Open-File Report 99-172 is a digital geologic data set that maps and describes the geology of the Santa Ana 30' x 60' quadrangle, southern California. The Santa Ana quadrangle database is one of several 30' x 60' quadrangle databases that are being produced by the Southern California Areal Mapping Project (SCAMP). These maps and databases are, in turn, part of the nation-wide digital geologic map coverage being developed by the National Cooperative Geologic Map Program of the U.S. Geological Survey (USGS).

Revisions made in Version 2.0

Several revisions have been made to version 1.0 of the Santa Ana 30' X 60' Quadrangle released in 1999. These changes justify the release of a subsequent version (Version 2.0, released in 2004).

1. Mapping was updated in fourteen 7.5' quadrangles (Corona North, Riverside West, Riverside East, Sunnymead, Corona South, Lake Mathews, Steele Peak, Perris, Lakeview, Elsinore, Romoland, Winchester, Murrieta, and Bachelor Mountain) comprising this 30' X 60' quadrangle, to reflect changes made when each was released at 1:24,000 scale, following the release of Version 1.0 of the Santa Ana 30' X 60' Quadrangle.
2. The El Casco 7.5' Quadrangle has also been revised, using unpublished mapping performed within the last two to three years.
3. Several quadrangles or portions of quadrangles that lie within Orange County (southern half of La Habra, southern half of Yorba Linda, western half and northwest quarter of Black Star

Canyon, southern half of Tustin, El Toro, western half of Santiago Peak, Laguna Beach, San Juan Capistrano, and Canada Gobernadora) were updated with mapping performed by the California Geological Survey.

4. Marine terraces mapped in the Newport Beach 7.5' Quadrangle were added to Version 2.0 of the Santa Ana 30' X 60' Quadrangle.

General

Open-File Report 99-172 contains a digital geologic map database of the Santa Ana 30' x 60' quadrangle, southern California that includes:

1. ARC/INFO (Environmental Systems Research Institute, http://www.esri.com) version 8.2 coverages (contained in /sanana2) of the various elements of the geologic map.
2. An Encapsulated PostScript file (sanana2.eps) to plot the geologic map on a topographic base with transportation, and hydrography data.
3. An Encapsulated PostScript file (sanana2cmu.eps) containing a Correlation of Map Units diagram (CMU), and an abbreviated description of map units.
4. A Microsoft Word Document (sanana2dmu.doc) containing a Description of Map Units (DMU).
5. A text document (sanana2met.met) containing the metadata for the geologic map.
6. Portable Document Format (.pdf) files of:
   a. This Readme; includes in Appendix I, data contained in 5 above.
   b. The same graphics as plotted in 2 and 3 above. Test plots have not produced precise 1:100,000-scale map sheets. Adobe Acrobat page size setting influences map scale.
   c. The same document as described in 4 above.

Within the geologic map data package, map units are identified by standard geologic map criteria such as formation-name, age, and lithology. Where known, grain size is indicated on the map by a subscripted letter or letters following the unit symbols as follows: lg, large boulders; b, boulder; g, gravel; a, arenaceous; s, silt; c, clay; e.g. Qyf_a is a predominantly young alluvial fan deposit that is arenaceous. Multiple letters are used for more specific identification or for mixed units, e.g., Qfy_{sa} is a silty sand. In some cases, mixed units are indicated by a compound symbol; e.g., Qyf_{2sc}.

Even though this is an Open-File Report and includes the standard USGS Open-File disclaimer, the report closely adheres to the stratigraphic nomenclature of the U.S. Geological Survey. Descriptions of units can be obtained by viewing or plotting the postscript file (3 above), the Microsoft Word Document (4 above), the .pdf version of the aforementioned postscript file (as referenced in 6b above), or the .pdf file (6c above).

This Readme file describes the digital data, such as types and general contents of files making up the database, and includes information on how to extract and plot the map and accompanying graphic file. Metadata information can be accessed at http://geo-nsdi.er.usgs.gov/metadata/open-file/99-172 and is included in Appendix I of this Readme.

HOW TO OBTAIN PAPER PLOTS

For those having access to large-format plotters such as HP650C, HP755C, and HP2500C, plots may be made directly from the included plot file.

DATABASE CONTENTS

The files constituting the geologic map database of this Open-File Report are listed below along with the interchange files from which they were extracted.

Data Package

All files listed below are in a compressed zipped file named sanana2.zip (22.8 Mb); see section below titled, SOFTWARE UTILITES.

ARC/INFO interchange files	Santa Ana Coverages	Contains
sa2_geo.e00	sa2_geo	Contacts, faults, geologic unit labels
sa2_ano.e00	sa2_ano	Annotation subclasses: CANYONS (for plotting canyon names) CITIES (for plotting city names) GEO (for plotting unit labels) FAULTS (for plotting fault names) MOUNTAIN (for plotting mountain names) WATER (for plotting names of water bodies) Leaders
sa2_str.e00	sa2_str	Attitudes and their dip values. Dip values plotted as annotation
sa2_point.e00	sa2_point	Fold axes Fold axes ornamentation
sa_hydr.e00	sa_hydr	Water bodies
sa_hyps.e00	sa_hyps	Topography
sa_trans.e00	sa_trans	Roads Cultural information

The directory, info/, is produced in the process of importing interchange files to ARC coverages in ARC/INFO. The sanana2 (Santa Ana) info/ directory contains:

Feature Attribute Tables

Polygon attribute table	sa2_geo.pat sa_hydr.pat
Arc attribute table	sa2_ano.aat sa2_geo.aat sa2_point.aat sa_hydr.aat sa_hyps.aat sa_trans.aat
Point attribute table	sa2_point.pat sa2_str.pat
Annotation attribute table	sa2_ano.tatcanyons sa2_ano.tatcities sa2_ano.tatfaults sa2_ano.tatgeo sa2_ano.tatmountains sa2_ano.tatwater

Plot Package

Encapsulated PostScript plot files of the geologic map and explanation; please see section below titled, SOFTWARE UTILITIES for additional information.

Compressed file	Resultant image	Contains
sanana2.eps.zip	sanana2.eps	Encapsulated PostScript plot file of geologic map
sanana2cmu.eps.zip	sanana2cmu.eps	Encapsulated PostScript plot file of a Correlation of Map Units diagram (CMU), and an abbreviated Description of Map Units (DMU)

The Encapsulated PostScript file is compressed using WinZip.

The uncompressed Encapsulated PostScript file sanana2.eps will plot a 1:100,000 scale, full color geologic map of the Santa Ana quadrangle along with hypsography, hydrography and transportation information derived from Digital Line Graphs (DLGs). The uncompressed Encapsulated PostScript file sanana2cmu.eps will plot the CMU and an abbreviated DMU. The sheets are approximately 40 X 32 inches and 42 X 36 inches in size respectively. The files have been successfully plotted on Hewlett-Packard large-format plotters, models HP2500C, and HP5000PS.

Symbols Package

Files in the plot package have been prepared to produce optimum plots using the shade, line, and marker sets listed below; these symbol sets and supporting fonts are included in a zipped file named symbols.zip (0.18 Mb).

geoSCAMP2.lin	Lineset
geoSCAMP2.mrk	Markerset for points
wpgcmykg.shd	Colors
geology2.shd	Pattern fills
fnt026	Font required for geoSCAMP2.lin
fnt037	Font required for geoSCAMP2.mrk
fnt035	Font required for geology2.shd

Special geologic characters used in unit designations are from the Geoage font group and are contained in the geoage folder within the symbols.zip file. The Geoage fonts are used in conjunction with the geofont.txt textset when using ESRI or Microsoft software. The geoage folder contains fonts, the geofont.txt textset, and explanatory files.

Other files

README.pdf	This document
sanana2.pdf	Geologic Map
sanana2dmu.pdf	Description of Map Units
sanana2cmu.pdf	Correlation of Map Units
sanana2dmu.doc	Description of Map Units (Microsoft Word text file)
sanana2met.met	Metadata text

SOFTWARE UTILITIES

Files with a .zip file extension were compressed using WinZip, available at http://www.winzip.com.

HOW TO OBTAIN THE DIGITAL FILES

The export files, and subsequently the data and plot files, constituting the geologic map database of this Open-File Map may be obtained in two ways, both over the Internet.

1. The files can be obtained via the Web from Western Region Geologic Information Server. Go to the web page at http://geopubs.wr.usgs.gov/open-file/of99-172 and follow the directions to download the files.
2. The files can also be obtained by anonymous ftp over the Internet from wrgis.wr.usgs.gov. The files are located in the directory /pub/open-file/. Be sure to use binary transfer mode or ASCII mode for individual .e00 (ARC interchange file format) files.

HOW TO EXTRACT THE GEOLOGIC MAP DATABASE FROM THE TAR FILE

Digital database

After downloading the files, they must be uncompressed using WinZip.

This process will create a directory, sanana2/, that will contain the ARC/INFO interchange files and supporting files. The directory should contain the following files:

sanana2/
- sa2_geo.e00
- sa2_ano.e00
- sa2_str.e00
- sa2_point.e00
- sa_hydr.e00
- sa_hyps.e00
- sa_trans.e00

The symbols.zip file is imported using the same methods as for the sanana2.zip file. It will create a directory, symbols/ that will contain the following directory and seven files:

- geoage/
- geoSCAMP2.lin
- geoSCAMP2.mrk
- wpgcmykg.shd
- geology2.shd
- fnt026
- fnt037
- fnt035

The following are not included in the database tar file, and are downloaded separately.

- sanana2.eps.zip
- sanana2cmu.eps.zip
- README.pdf
- sanana2.pdf
- sanana2dmu.pdf
- sanana2cmu.pdf
- sanana2dmu.doc

sanana2met.met

Encapsulated PostScript plot files

Make an uncompressed file, sanana2.eps (49.4 Mb) or sanana2cmu.eps (1.9 Mb), by using WinZip.

Portable Document Format (.pdf) files

PDF files are not stored as zipped files. They are accessed using Adobe Acrobat Reader software, available free from the Adobe website http://www.adobe.com. 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 (EXPORT) FILES

The ARC interchange (.e00) files are converted to ARC coverages using the ARC command IMPORT.

ARC interchange files can also be read by some other Geographic Information Systems, including ArcView (ESRI) and MapInfo (http://www.mapinfo.com), (Environmental Systems Research Institute, Inc., 1998). Please consult your GIS documentation to see if you can use ARC interchange files and the procedure to import them.

DIGITAL GEOLOGIC MAP SPECIFICATIONS

Digital compilation

The geologic map was compiled from 31 1:24,000 7'5 quadrangles that comprise the Santa Ana 30' x 60' quadrangle. These 7.5' quadrangles were mapped and (or) compiled chiefly at 1:24,000 scale. Some localized map data compiled from earlier mapping were at larger and smaller scales, but none smaller than 1:62,500. Sources of map data are given in Figure 2 of sanana2dmu.pdf, and are also listed in tables near the end of the document; names of the digital preparers are listed by 7.5' quadrangle. This information is also given in sanana2dmu.doc. The compilation at 1:100,000 scale entailed necessary simplification in some areas and combining of some geologic units. Overall, however, despite a greater than four times reduction in scale, most geologic detail found on the 1:24,000 maps is retained on the 1:100,000 map. Geologic contacts across boundaries of the 31 constituent quadrangles required adjustments, but none significant at the final 1:100,000 scale. Even though all of the source geologic data are from significantly larger scale maps, the 1:100,000 scale compilation in this report is intended for use at that scale; digital or plotted enlargements of all or part of the map were not intended and could result in misleading map data. The lines, points, and polygons were edited using standard ARC/INFO commands, and in some places, interactively by hand using graphical user interface ALACARTE (Fitzgibbon, 1991, Fitzgibbon and Wentworth, 1991, Wentworth and Fitzgibbon, 1991). Digitization and editing artifacts significant enough to display at a scale of 1:24,000 were corrected.

Base map

Hypsography, hydrography and transportation data were converted from 1:100,000 DLGs (prepared and available from The National Cartographic Information Center) to ARC/INFO coverages.

Spatial resolution

Use of this digital geologic map database 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 edited at a scale of 1:100,000 means that higher resolution information is not generally 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 above the intended resolution of the database. Similarly, although higher resolution data is incorporated at a few places, the resolution of the combined output will be limited by the lower resolution data.

Map accuracy standards

All contacts on the geologic map are shown as solid lines. Until uniform national geologic map standards are developed and adopted, lines and points on SCAMP 1:100,000 scale geologic maps that are located to within 50 meters, relative to accurately located features on the base map, are considered to meet map accuracy standards. Published and unpublished mapping by the compiler are known to generally meet this map accuracy standard. Most, but not all, mapping compiled from other sources is known to generally meet this map accuracy standard.

Faults and landslides

This database is sufficiently detailed to identify and characterize many actual and potential geologic hazards represented by faults and landslides, but it is not sufficiently detailed for site-specific determinations. Faults shown do not take the place of fault rupture hazard zones designated by the California State Geologist (see Hart, 1998).

Database specifics

General--The map database consists of ARC/INFO format coverages, which are stored in UTM projection (Table 1). Digital tics define a 7.5-minute grid of latitude and longitude that corresponds to the respective corners of the 31 1:24,000 7.5' quadrangles encompassed by the Santa Ana 30' x 60' quadrangle.

Table 1 --- Map Projection

Projection	UTM
Zone	11
Zunits	No
Units	Meters
Spheroid	Clark 1866
X shift	0.000000000
Y shift	0.000000000
Parameters	

The content of the geologic database can be described in terms of feature classes that include lines, points, and areas that comprise the map. See the metadata text file (Appendix I) for detailed descriptions.

Lines – Lines are recorded as strings of arcs and are described in an arc attribute (.aat) table. Complete lists of the line types (LTYPE) used in the quadrangle are available in Appendix I. They represent contacts and faults, which define the boundaries of map units and map boundaries.

Polygons --- Geologic map units (polygons) are described in the polygon attribute (.pat) table (details in Appendix I). For traditional descriptions of the map units, see the Microsoft Word Document sanana2dmu.doc, or the Portable Document Format sanana2cmu.pdf or sanana2dmu.pdf, or the Encapsulated PostScript map plot, sanana2cmu.eps. A list of all map units in the database is given in Appendix I.

Points – Point information (attitudes of planar and linear features) is recorded as coordinate and related information. Complete lists of the point types (PTTYPE) used in the point coverages are available in Appendix I.

REFERENCES

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

Hart, E.W., 1988, Fault-rupture zones in California; Alquist-Priolo Special Studies Zones Act of 1972 with index to special studies zones maps: California Division of Mines and Geology Special Publication 42

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

APPENDIX I (original metadata text)

Identification_Information:

Citation:
Citation_Information:
Originator: D.M. Morton
Publication_Date: 2004
Title: Preliminary Digital Geologic Map of the Santa Ana 30' X 60' Quadrangle, southern California, version 2.0
Edition: Version 2.0
Geospatial_Data_Presentation_Form: vector digital data
Series_Information:
Series_Name: U.S. Geological Survey Open-File Report
Issue_Identification: USGS OFR 99-172
Publication_Information:
Publication_Place: Menlo Park, California
Publisher: U.S. Geological Survey
Online_Linkage: Online_Linkage URL:http://geopubs.wr.usgs.gov/open-file/of99-172

Description:

Abstract:

The Santa Ana Quadrangle is in the northern part of the Peninsular Ranges Province as defined by Jahns (1954). The quadrangle is underlain by rocks characteristic of the eastern part of the province except for the northeast corner, which is underlain by basement rocks of the Transverse Ranges Province. A summary of the general geology of the Peninsular Ranges Province is given by Jahns (1954) and a generalized geologic map of this part of the Peninsular Ranges Province is given by Rogers (1965).

Physiographically, the northern part of the Peninsular Ranges Province is divided into three major, fault-bounded blocks, the Santa Ana Mountains, Perris, and San Jacinto Mountains. The Santa Ana Mountains block is the westernmost of the three, extending eastward from the coast to the Elsinore fault zone. Tertiary sedimentary rocks ranging in age from Paleocene through Pliocene underlie most of the western part of the Santa Ana block. East of these Tertiary rocks, in the Santa Ana Mountains, a highly faulted anticlinal structure, is cored by a basement assemblage of Mesozoic metasedimentary and Cretaceous volcanic and batholithic rocks. Overlying this basement is a thick section of primarily upper Cretaceous marine rocks, and Paleogene marine and nonmarine rocks. In the southern part of the Santa Ana Mountains the anticlinal nature of the mountains passes into extensive, nearly horizontal erosional surface that is partly covered by Miocene basalt flows.

North of the Santa Ana Mountains block, the relatively low Puente Hills are underlain principally by folded and faulted Neogene marine sedimentary rocks of the Los Angeles basin (e.g., Yerkes and others, 1965). Up to 8,200 m of middle and late Miocene age rocks are exposed in the Puente Hills, strata equivalent to those from which most of the petroleum of the Los Angeles basin has been produced (Durham and Yerkes, 1964; Yerkes, 1972). Located between the Puente Hills and the Santa Ana Mountains are several anticlinal structures exposing marine Pleistocene strata (Yerkes, 1972).

East of the Santa Ana block and west of the San Jacinto fault zone is the Perris block, a roughly rectangular area of relatively low relief, that has remained relatively stable and undeformed during the Neogene. The Perris block is underlain by lithologically diverse prebatholithic metasedimentary rocks intruded by plutons of the Cretaceous Peninsular Ranges batholith. Supra-batholithic volcanic rocks are preserved in the western part of the block. Several erosional and depositional surfaces are developed on the Perris block (e.g., Dudley, 1936; Woodford and others, 1971) and thin to relatively thick sections of nonmarine, mainly Quaternary sediments discontinuously cover the basement. The older surfaces are of probable Paleogene age and there is suggestive evidence that Paleogene sedimentary deposits once covered at least the western part of the block.

The San Jacinto Mountains block lies east of the Perris block, but only the northern part of it extends into the Santa Ana quadrangle. A thick section of Miocene through Pleistocene nonmarine sedimentary rocks underlies most of the northern San Jacinto Mountains block allowing limited granitic and metamorphic rocks to show through only in the southern part of the quadrangle.

Purpose: The data set for the Santa Ana 30' X 60' quadrangle was prepared under the U.S. Geological Survey Southern California Areal Mapping Project (SCAMP) as part of an ongoing effort to develop a regional geologic framework of southern California, and to utilize a Geographic Information System (GIS) format to create regional digital geologic databases. These regional databases are being developed as contributions to the National Geologic Map Database of the National Cooperative Geologic Mapping Program of the USGS.

Supplemental_Information: none
Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 2004
Currentness_Reference: Revised data - revised from Preliminary Digital Geologic Map of the Santa Ana 30' X 60' Quadrangle, southern California, version 1.0

Status:

Progress: Complete
Maintenance_and_Update_Frequency: As Needed

Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -118.00582042
East_Bounding_Coordinate: -116.99999932
North_Bounding_Coordinate: 34.00406515
South_Bounding_Coordinate: 33.49596357

Keywords:
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword: geologic map
Theme_Keyword: alluvial deposits
Theme_Keyword: sedimentary rocks
Theme_Keyword: volcanic rocks
Theme_Keyword: plutonic rocks
Theme_Keyword: metasedimentary rocks
Theme_Keyword: strike-slip faults
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: California
Place_Keyword: Riverside County
Place_Keyword: Orange County
Place_Keyword: San Bernardino County
Place_Keyword: San Diego County
Place_Keyword: Santa Ana
Place_Keyword: Huntington Beach
Place_Keyword: Fullerton
Place_Keyword: Corona
Place_Keyword: Riverside
Place_Keyword: Moreno Valley
Place_Keyword: Perris
Place_Keyword: Elsinore
Place_Keyword: Rancho California
Place_Keyword: Crestmore Quarry
Place_Keyword: Jensen Quarry
Stratum:
Stratum_Keyword_Thesaurus: None
Stratum_Keyword: alluvium
Stratum_Keyword: sedimentary rocks
Stratum_Keyword: volcanic rocks
Stratum_Keyword: plutonic rocks
Stratum_Keyword: metamorphic rocks
Temporal:
Temporal_Keyword_Thesaurus: None
Temporal_Keyword: Quaternary deposits
Temporal_Keyword: Cenozoic sedimentary rocks
Temporal_Keyword: Cenozoic volcanic rocks
Temporal_Keyword: Cretaceous sedimentary rocks
Temporal_Keyword: Cretaceous volcanic rocks
Temporal_Keyword: Cretaceous plutonic rocks
Temporal_Keyword: Mesozoic metasedimentary rocks
Temporal_Keyword: Paleozoic metasedimentary rocks

Access_Constraints: None

Use_Constraints:
The Santa Ana 30' X 60' geologic-map database should be used to evaluate and understand the geologic character of the Santa Ana 30' X 60' quadrangle as a whole. The data should not be used for purposes of site-specific land-use planning or site-specific geologic evaluations. The database is sufficiently detailed to identify and characterize many actual and potential geologic hazards represented by faults and landslides and posed by ground subsidence and earthquake-generated ground shaking. However, it is not sufficiently detailed for site-specific determinations or evaluations of these features. Faults shown do not take the place of fault-rupture hazard zones designated by the California State Geologist (see Hart, 1988).

Use of this digital geologic-map database 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 1:100,000 means that higher resolution information may not have been uniformly retained in the dataset. Plotting at scales larger than 1:100,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, although higher resolution data is incorporated in most of the map, the resolution of the combined output will be limited by the lower resolution data.

Point_of_Contact:
Contact_Information:
Contact_Person_Primary:
Contact_Person: Douglas M. Morton
Contact_Organization: U.S. Geological Survey, Western Surficial Processes Team
Contact_Position: Project Geologist
Contact_Address:
Address_Type: mailing address
Address: U.S. Geological Survey
Address: Department of Earth Sciences
Address: University of California, Riverside
City: Riverside
State_or_Province: California
Postal_Code: 92521
Country: United States of America
Contact_Voice_Telephone: (909) 276-6397
Contact_Facsimile_Telephone: (909) 276-6295
Contact_Electronic_Mail_Address: scamp@usgs.gov

Data_Set_Credit: Geologic mapping and digital preparation of this report were sponsored by (1) the Southern California Areal Mapping Project (SCAMP) and (2) the California Geological Survey.
Native_Data_Set_Environment:
Windows_NT, 5.1, Intel
ARC/INFO version 8.2

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Geologic-map units in the Santa Ana quadrangle database were described using standard field methods. Consistent with these methods, the database author has assigned standard geologic attributes to geologic lines, points, and polygons identified in the database.

Nation-wide geologic-map accuracy standards have not been developed and adopted by the U.S. Geological Survey and other earth-science entities. Until such standards are adopted, the SCAMP project has developed internal map-accuracy standards for 1:100,000-scale geologic maps produced by the project.

Geologic lines and points on 1:100,000 scale geologic maps are judged to meet SCAMP's internal map-accuracy standards if they are located to within +/-15 meters, relative to topographic or cultural features on the base map.

On any derivative geologic-map plot, line data (excluding geologic contacts) that are judged to meet the SCAMP internal map-accuracy standard are denoted by solid lines; line data (excluding geologic contacts) that may not meet the SCAMP internal map-accuracy standard are denoted by dashed or dotted lines. On any derivative geologic-map plot, all geologic contact line data is represented by a solid line whether it meets the SCAMP internal map-accuracy standard or not. There is no cartographic device for denoting the map-accuracy for geologic-point data (e.g., symbols representing bedding, foliation, lineations, etc.).
Logical_Consistency_Report: Polygon and chain-node topology present. The areal extent of the map is represented digitally by an appropriately projected (UTM projection), mathematically generated box. Consequently, polygons intersecting the lines that comprise the map boundary are closed by that boundary. Polygons internal to the map boundary are completely enclosed by line segments which are themselves a set of sequentially numbered coordinate pairs. Point data are represented by coordinate pairs.
Completeness_Report: The geologic map database of the Santa Ana 30' X '60' quadrangle contains new data that have been subjected to rigorous review and are a substantially complete representation of the current state of knowledge concerning the geology of the quadrangle.
Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report: The maximum transformation RMS error acceptable for a 7.5' quadrangle (used to create this 30' X 60' map) transformation and data input is 0.003 (1.8 meters). Horizontal positional accuracy was checked by visual comparison of hard-copy plots with base-stable source data.
Lineage:
Process_Step:
Process_Description: Field mapping and aerial photograph interpretation; iterative process.
Process_Date: 1919-2003
Process_Step:
Process_Description: Digitization of geologic linework and point data from a scale-stable cartographic base of quadrangle. ARC/INFO database established; cleanup of artifacts; polygon, arc, and point attribute tables established. Digitizing and editing artifacts significant enough to display at a scale of 1:24,000 were corrected.
Process_Date: 1997-2004
Process_Step:
Process_Description: Compilation of 31 1:24000 scale quadrangles into the Santa Ana 30' X 60' Quadrangle
Process_Date: 1997-2004
Process_Step:
Process_Description: Description of map units and correlation of map units (F.K. Miller and K.R. Bovard).
Process_Date: 1997-2004
Process_Step:
Process_Description:
First draft of metadata created by Kelly Bovard using
FGDCMETA.AML ver. 1.2 05/14/98 on ARC/INFO data set
c:\kbovard\combinedsasb\sasb\santa_ana\sa2_geo
Process_Date: 20040311
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Vector
Point_and_Vector_Object_Information:
SDTS_Terms_Description:
SDTS_Point_and_Vector_Object_Type: Point
Point_and_Vector_Object_Count: 15475
SDTS_Point_and_Vector_Object_Type: String
Point_and_Vector_Object_Count: 43819
SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains
Point_and_Vector_Object_Count: 15476

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:
Planar:
Grid_Coordinate_System:
Grid_Coordinate_System_Name: Universal Transverse Mercator
Universal_Transverse_Mercator:
UTM_Zone_Number: 11
Transverse_Mercator:
Scale_Factor_at_Central_Meridian: implied
Longitude_of_Central_Meridian: implied
Latitude_of_Projection_Origin: implied
False_Easting: implied
False_Northing: implied
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 0.0027657051105
Ordinate_Resolution: 0.0027657051105
Planar_Distance_Units: Meters
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Clarke 1866
Semi-major_Axis: 6378206.4
Denominator_of_Flattening_Ratio: 294.98

Entity_and_Attribute_Information:
Overview_Description:
Entity_and_Attribute_Overview:
Version 2.0 of the Santa Ana 30' X 60' quadrangle comprises four ARC/INFO coverages, of which three contain geologic data, and one contains cartographic features: sa2_geo (geology), sa2_str (structural point data), sa2_point (fold axes and symbols), and sa2_ano (annotation and leaders).

Geologic data represented by line entities and the polygons they delineate are contained in the coverage sa2_geo.

Structural point data (sa2_str) includes site-specific information describing the types and the orientation of foliation, joints and lineations. Annotation is respective dip and plunge values associated with individual point data.

Fold axes line and point data (sa2_point) includes site-specific information describing the types and the orientation of fold axes.

For display purposes, the annotation coverage (sa2_ano) contains six annotation subclass: anno.canyons contains canyon names, anno.cities contains city names, anno.faults contains fault names, anno.geo contains unit labels, anno.mountain contains mountain names, and anno.water contains water body names.

SA2_GEO.PAT:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME
1	AREA	8	18	F	5	
9	PERIMETER	8	18	F	5	
17	SA2_GEO#	4	5	B	-	
21	SA2_GEO-ID	4	5	B	-	
25	LABL	35	35	C	-	
60	PLABL	35	35	C	-	
95	SHD	3	3	I	-	
98	SHDFIL	3	3	I	-	
101	NAME	200	200	C	-	

SA2_GEO.AAT:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	ALTERNATE NAME
1	FNODE#	4	5	B	-	
5	TNODE#	4	5	B	-	
9	LPOLY#	4	5	B	-	
13	RPOLY#	4	5	B	-	
17	LENGTH	8	18	F	5	
25	SA2_GEO#	4	5	B	-	
29	SA2_GEO-ID	4	5	B	-	
33	LTYPE	45	45	C	-	
78	L-SYMB	3	3	I	-	

Entity_and_Attribute_Detail_Citation: none

Detailed_Description:
Entity_Type:
Entity_Type_Label: sa2_geo.pat
Entity_Type_Definition: Geologic unit names (LABL), geologic unit names containing special characters used for plotting (PLABL), coded integers corresponding to colors (SHD) and patterns (SHDFIL) used for plotting, and a brief unit description (NAME) for units identified in the Santa Ana 30' X 60' quadrangle
Attribute:
Attribute_Label: LABL, NAME
Attribute_Definition: geologic map unit label, in plain text followed by a brief unit description
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Qaf
Enumerated_Domain_Value_Definition: Artificial fill
Enumerated_Domain:
Enumerated_Domain_Value: Qw
Enumerated_Domain_Value_Definition: Wash deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qw3
Enumerated_Domain_Value_Definition: Wash deposits, Unit 3
Enumerated_Domain:
Enumerated_Domain_Value: Qf
Enumerated_Domain_Value_Definition: Alluvial fan deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qf1
Enumerated_Domain_Value_Definition: Alluvial fan deposits, Unit 1
Enumerated_Domain:
Enumerated_Domain_Value: Qa
Enumerated_Domain_Value_Definition: Axial channel deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qv
Enumerated_Domain_Value_Definition: Alluvial valley deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qsw
Enumerated_Domain_Value_Definition: Slope wash deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qc
Enumerated_Domain_Value_Definition: Colluvial deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qls
Enumerated_Domain_Value_Definition: Landslide deposits

Enumerated_Domain:
  Enumerated_Domain_Value: Qe
  Enumerated_Domain_Value_Definition: Eolian deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qm
  Enumerated_Domain_Value_Definition: Marine deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qes
  Enumerated_Domain_Value_Definition: Estuarine deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Ql
  Enumerated_Domain_Value_Definition: Lacustrine deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qlv
  Enumerated_Domain_Value_Definition: Lacustrine and fluvial deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qyw
  Enumerated_Domain_Value_Definition: Young wash deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf7
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 7
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf6
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 6
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf5
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 5
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf4
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 4
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf3
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 3
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf2
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 2
Enumerated_Domain:
  Enumerated_Domain_Value: Qyf1
  Enumerated_Domain_Value_Definition: Young alluvial fan deposits, Unit 1
Enumerated_Domain:
  Enumerated_Domain_Value: Qya
  Enumerated_Domain_Value_Definition: Young axial channel deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qya6
  Enumerated_Domain_Value_Definition: Young axial channel deposits, Unit 6
Enumerated_Domain:
  Enumerated_Domain_Value: Qya5
  Enumerated_Domain_Value_Definition: Young axial channel deposits, Unit 5
Enumerated_Domain:
  Enumerated_Domain_Value: Qya4
  Enumerated_Domain_Value_Definition: Young axial channel deposits, Unit 4
Enumerated_Domain:
  Enumerated_Domain_Value: Qya3

Enumerated_Domain_Value_Definition: Young axial channel deposits, Unit 3
Enumerated_Domain:
Enumerated_Domain_Value: Qyv
Enumerated_Domain_Value_Definition: Young alluvial valley deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qyv1
Enumerated_Domain_Value_Definition: Young alluvial valley deposits, unit 1
Enumerated_Domain:
Enumerated_Domain_Value: Qyc
Enumerated_Domain_Value_Definition: Young colluvial deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qyls
Enumerated_Domain_Value_Definition: Young landslide deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qye
Enumerated_Domain_Value_Definition: Young eolian deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qypt
Enumerated_Domain_Value_Definition: Young peat deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qow
Enumerated_Domain_Value_Definition: Old alluvial wash deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qof
Enumerated_Domain_Value_Definition: Old alluvial fan deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qofv
Enumerated_Domain_Value_Definition: Old alluvial fan deposits and young alluvial fan deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qof3

Enumerated_Domain_Value_Definition: Old alluvial fan deposits, Unit 3
Enumerated_Domain:
Enumerated_Domain_Value: Qof1
Enumerated_Domain_Value_Definition: Old alluvial fan deposits, Unit 1
Enumerated_Domain:
Enumerated_Domain_Value: Qoa
Enumerated_Domain_Value_Definition: Old axial channel deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qoa7
Enumerated_Domain_Value_Definition: Old axial channel deposits, Unit 7
Enumerated_Domain:
Enumerated_Domain_Value: Qoa3
Enumerated_Domain_Value_Definition: Old axial channel deposits, Unit 3
Enumerated_Domain:
Enumerated_Domain_Value: Qoa1
Enumerated_Domain_Value_Definition: Old axial channel deposits, Unit 1
Enumerated_Domain:
Enumerated_Domain_Value: Qov
Enumerated_Domain_Value_Definition: Old alluvial valley deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qoc
Enumerated_Domain_Value_Definition: Old colluvial deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qols
Enumerated_Domain_Value_Definition: Old landslide deposits

Enumerated_Domain:
  Enumerated_Domain_Value: Qop
  Enumerated_Domain_Value_Definition: Old paralic deposits, undivided
Enumerated_Domain:
  Enumerated_Domain_Value: Qop7
  Enumerated_Domain_Value_Definition: Old paralic deposits, Unit 7
Enumerated_Domain:
  Enumerated_Domain_Value: Qop6
  Enumerated_Domain_Value_Definition: Old paralic deposits, Unit 6
Enumerated_Domain:
  Enumerated_Domain_Value: Qop4
  Enumerated_Domain_Value_Definition: Old paralic deposits, Unit 4
Enumerated_Domain:
  Enumerated_Domain_Value: Qop3
  Enumerated_Domain_Value_Definition: Old paralic deposits, Unit 3
Enumerated_Domain:
  Enumerated_Domain_Value: Qop2
  Enumerated_Domain_Value_Definition: Old paralic deposits, Unit 2
Enumerated_Domain:
  Enumerated_Domain_Value: Qop1
  Enumerated_Domain_Value_Definition: Old paralic deposits, Unit 1
Enumerated_Domain:
  Enumerated_Domain_Value: Qop2-6
  Enumerated_Domain_Value_Definition: Old paralic deposits, Units 2-6, undivided
Enumerated_Domain:
  Enumerated_Domain_Value: Qop3-6
  Enumerated_Domain_Value_Definition: Old paralic deposits, Units 3-6, undivided
Enumerated_Domain:
  Enumerated_Domain_Value: Qopf
  Enumerated_Domain_Value_Definition: Old paralic deposits overlain by alluvial fan deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qos
  Enumerated_Domain_Value_Definition: Old surficial deposits, undivided
Enumerated_Domain:
  Enumerated_Domain_Value: Qvof
  Enumerated_Domain_Value_Definition: Very old alluvial fan deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qvof3
  Enumerated_Domain_Value_Definition: Very old alluvial fan deposits, Unit 3
Enumerated_Domain:
  Enumerated_Domain_Value: Qvof1
  Enumerated_Domain_Value_Definition: Very old alluvial fan deposits, Unit 1
Enumerated_Domain:
  Enumerated_Domain_Value: Qvoa
  Enumerated_Domain_Value_Definition: Very old axial channel deposits
Enumerated_Domain:
  Enumerated_Domain_Value: Qvoa5
  Enumerated_Domain_Value_Definition: Very old axial channel deposits, Unit 5
Enumerated_Domain:
  Enumerated_Domain_Value: Qvoa4
  Enumerated_Domain_Value_Definition: Very old axial channel deposits, Unit 4
Enumerated_Domain:
  Enumerated_Domain_Value: Qvoa3
  Enumerated_Domain_Value_Definition: Very old axial channel deposits, Unit 3
Enumerated_Domain:
  Enumerated_Domain_Value: Qvoa2

Enumerated_Domain_Value_Definition: Very old axial channel deposits, Unit 2
Enumerated_Domain:
Enumerated_Domain_Value: Qvoa1
Enumerated_Domain_Value_Definition: Very old axial channel deposits, Unit 1
Enumerated_Domain:
Enumerated_Domain_Value: Qvov
Enumerated_Domain_Value_Definition: Very old alluvial valley deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qvols
Enumerated_Domain_Value_Definition: Very old landslide deposits
Enumerated_Domain:
Enumerated_Domain_Value: Qvop
Enumerated_Domain_Value_Definition: Very old paralic deposits, undivided
Enumerated_Domain:
Enumerated_Domain_Value: Qvor
Enumerated_Domain_Value_Definition: Very old regolith
Enumerated_Domain:
Enumerated_Domain_Value: Qps
Enumerated_Domain_Value_Definition: Pauba Formation, sandstone member
Enumerated_Domain:
Enumerated_Domain_Value: Qpf
Enumerated_Domain_Value_Definition: Pauba Formation, fanglomerate member
Enumerated_Domain:
Enumerated_Domain_Value: Qlh
Enumerated_Domain_Value_Definition: La Habra Formation
Enumerated_Domain:
Enumerated_Domain_Value: QTws
Enumerated_Domain_Value_Definition: Sandstone and conglomerate of Wildomar area, sandstone unit
Enumerated_Domain:
Enumerated_Domain_Value: QTwc
Enumerated_Domain_Value_Definition: Sandstone and conglomerate of Wildomar area, conglomerate unit
Enumerated_Domain:
Enumerated_Domain_Value: Qch
Enumerated_Domain_Value_Definition: Coyote Hills Formation
Enumerated_Domain:
Enumerated_Domain_Value: Qsp
Enumerated_Domain_Value_Definition: San Pedro Formation
Enumerated_Domain:
Enumerated_Domain_Value: Qsp4
Enumerated_Domain_Value_Definition: San Pedro Formation, sandstone
Enumerated_Domain:
Enumerated_Domain_Value: Qsp3
Enumerated_Domain_Value_Definition: San Pedro Formation, siltstone and claystone
Enumerated_Domain:
Enumerated_Domain_Value: Qsp2
Enumerated_Domain_Value_Definition: San Pedro Formation, sandstone
Enumerated_Domain:
Enumerated_Domain_Value: Qsp1
Enumerated_Domain_Value_Definition: San Pedro Formation, siltstone and claystone
Enumerated_Domain:
Enumerated_Domain_Value: Qstu
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), upper member
Enumerated_Domain:
Enumerated_Domain_Value: Qsts

Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), upper member, conglomerate sandstone beds
Enumerated_Domain:
Enumerated_Domain_Value: Qstcq
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), upper member, quartzite-bearing conglomerate beds
Enumerated_Domain:
Enumerated_Domain_Value: Tstm
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), middle member
Enumerated_Domain:
Enumerated_Domain_Value: Tstd
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), middle member, highly deformed sandstone, pebbly sandstone, and conglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Tstl
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), lower member
Enumerated_Domain:
Enumerated_Domain_Value: Tstl2
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), lower member, claystone, siltstone, and sandstone characterized by ripple lamination
Enumerated_Domain:
Enumerated_Domain_Value: Tstl1
Enumerated_Domain_Value_Definition: San Timoteo beds of Frick (1921), lower member, arkosic sandstone
Enumerated_Domain:
Enumerated_Domain_Value: QTs
Enumerated_Domain_Value_Definition: Unnamed late Cenozoic sedimentary rocks in Riverside and Corona area
Enumerated_Domain:
Enumerated_Domain_Value: QTt
Enumerated_Domain_Value_Definition: Late Cenozoic conglomerate of Temescal area
Enumerated_Domain:
Enumerated_Domain_Value: QTc
Enumerated_Domain_Value_Definition: Conglomeratic sedimentary rocks of Riverside West 7.5' quadrangle
Enumerated_Domain:
Enumerated_Domain_Value: QTn
Enumerated_Domain_Value_Definition: Late Cenozoic sedimentary rocks of Norco area
Enumerated_Domain:
Enumerated_Domain_Value: Tta
Enumerated_Domain_Value_Definition: Temecula Arkose
Enumerated_Domain:
Enumerated_Domain_Value: Tf
Enumerated_Domain_Value_Definition: Fernando Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tfu
Enumerated_Domain_Value_Definition: Fernando Formation, upper member
Enumerated_Domain:
Enumerated_Domain_Value: Tfuc
Enumerated_Domain_Value_Definition: Fernando Formation, upper member, conglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Tfl
Enumerated_Domain_Value_Definition: Fernando Formation, lower member
Enumerated_Domain:
Enumerated_Domain_Value: Tflc
Enumerated_Domain_Value_Definition: Fernando Formation, lower member, conglomerate

Enumerated_Domain:
Enumerated_Domain_Value: Tn
Enumerated_Domain_Value_Definition: Niguel Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tns
Enumerated_Domain_Value_Definition: Sandstone of Norco area
Enumerated_Domain:
Enumerated_Domain_Value: Tc
Enumerated_Domain_Value_Definition: Capistrano Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tco
Enumerated_Domain_Value_Definition: Capistrano Formation, Oso Member
Enumerated_Domain:
Enumerated_Domain_Value: Tcs
Enumerated_Domain_Value_Definition: Capistrano Formation, siltstone facies
Enumerated_Domain:
Enumerated_Domain_Value: Tme
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931)
Enumerated_Domain:
Enumerated_Domain_Value: Tmeus
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931), upper sandstone member
Enumerated_Domain:
Enumerated_Domain_Value: Tmem
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931), mudrock member
Enumerated_Domain:
Enumerated_Domain_Value: Tmels
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931), lower sandstone member
Enumerated_Domain:
Enumerated_Domain_Value: Tmea
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931), arkosic sandstone member
Enumerated_Domain:
Enumerated_Domain_Value: Tmeb
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931), arkosic sandstone member, tongues of monolithologic tonalite boulder breccia
Enumerated_Domain:
Enumerated_Domain_Value: Tmec
Enumerated_Domain_Value_Definition: Mount Eden Formation of Fraser (1931), conglomerate sandstone member
Enumerated_Domain:
Enumerated_Domain_Value: Tch
Enumerated_Domain_Value_Definition: Sandstone and conglomerate in southeastern Chino Hills
Enumerated_Domain:
Enumerated_Domain_Value: Tp
Enumerated_Domain_Value_Definition: Puente Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tpsc
Enumerated_Domain_Value_Definition: Sycamore Canyon Member
Enumerated_Domain:
Enumerated_Domain_Value: Tpscc
Enumerated_Domain_Value_Definition: Sycamore Canyon Member, conglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Tpy
Enumerated_Domain_Value_Definition: Yorba Member

Enumerated_Domain:
  Enumerated_Domain_Value: Tpyc
  Enumerated_Domain_Value_Definition: Yorba Member, conglomerate
Enumerated_Domain:
  Enumerated_Domain_Value: Tpsq
  Enumerated_Domain_Value_Definition: Soquel Member
Enumerated_Domain:
  Enumerated_Domain_Value: Tplv
  Enumerated_Domain_Value_Definition: La Vida Member
Enumerated_Domain:
  Enumerated_Domain_Value: Tlm
  Enumerated_Domain_Value_Definition: Lake Mathews Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Tcgr
  Enumerated_Domain_Value_Definition: Rhyolite clast conglomerate of Lake Mathews area
Enumerated_Domain:
  Enumerated_Domain_Value: Tcg
  Enumerated_Domain_Value_Definition: Conglomerate of Lake Mathews area
Enumerated_Domain:
  Enumerated_Domain_Value: Tm
  Enumerated_Domain_Value_Definition: Monterey Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Tvsr
  Enumerated_Domain_Value_Definition: Santa Rosa basalt of Mann
Enumerated_Domain:
  Enumerated_Domain_Value: Tvt
  Enumerated_Domain_Value_Definition: Basalt of Temecula area
Enumerated_Domain:
  Enumerated_Domain_Value: Tvh
  Enumerated_Domain_Value_Definition: Basalt of Hogbacks
Enumerated_Domain:
  Enumerated_Domain_Value: Tvep
  Enumerated_Domain_Value_Definition: Basalt of Elsinore Peak
Enumerated_Domain:
  Enumerated_Domain_Value: Tsob
  Enumerated_Domain_Value_Definition: San Onofre Breccia
Enumerated_Domain:
  Enumerated_Domain_Value: Tt
  Enumerated_Domain_Value_Definition: Topanga Formation
Enumerated_Domain:
  Enumerated_Domain_Value: Ttp
  Enumerated_Domain_Value_Definition: Paulerino Member
Enumerated_Domain:
  Enumerated_Domain_Value: Ttlt
  Enumerated_Domain_Value_Definition: Los Trancos Member
Enumerated_Domain:
  Enumerated_Domain_Value: Ttb
  Enumerated_Domain_Value_Definition: Bommer Member
Enumerated_Domain:
  Enumerated_Domain_Value: Tvem
  Enumerated_Domain_Value_Definition: El Modeno Volcanics
Enumerated_Domain:
  Enumerated_Domain_Value: Tvema
  Enumerated_Domain_Value_Definition: Andesite volcanic rocks
Enumerated_Domain:
  Enumerated_Domain_Value: Tvemt

Enumerated_Domain_Value_Definition: Tuff and tuff breccia
Enumerated_Domain:
Enumerated_Domain_Value: Tvemb
Enumerated_Domain_Value_Definition: Basalt
Enumerated_Domain:
Enumerated_Domain_Value: Ta
Enumerated_Domain_Value_Definition: Andesite intrusive rocks
Enumerated_Domain:
Enumerated_Domain_Value: Td
Enumerated_Domain_Value_Definition: Diabase intrusive rocks
Enumerated_Domain:
Enumerated_Domain_Value: Tvss
Enumerated_Domain_Value_Definition: Vaqueros, Sespe, Santiago, and Silverado Formations, undifferentiated
Enumerated_Domain:
Enumerated_Domain_Value: Tv
Enumerated_Domain_Value_Definition: Vaqueros Formation
Enumerated_Domain:
Enumerated_Domain_Value: Ts
Enumerated_Domain_Value_Definition: Sespe Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tvs
Enumerated_Domain_Value_Definition: Vaqueros and Sespe Formations, undifferentiated
Enumerated_Domain:
Enumerated_Domain_Value: Tcga
Enumerated_Domain_Value_Definition: Conglomerate of Arlington Mountain
Enumerated_Domain:
Enumerated_Domain_Value: Tep
Enumerated_Domain_Value_Definition: Sandstone of Elsinore Peak
Enumerated_Domain:
Enumerated_Domain_Value: Tsa
Enumerated_Domain_Value_Definition: Santiago Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tsi
Enumerated_Domain_Value_Definition: Silverado Formation
Enumerated_Domain:
Enumerated_Domain_Value: Tsicg
Enumerated_Domain_Value_Definition: Silverado Formation, basal conglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Tsis
Enumerated_Domain_Value_Definition: Silverado Formation, Serrano clay
Enumerated_Domain:
Enumerated_Domain_Value: Kwl
Enumerated_Domain_Value_Definition: Williams and Ladd Formations, undifferentiated
Enumerated_Domain:
Enumerated_Domain_Value: Kwps
Enumerated_Domain_Value_Definition: Williams Formation, Pleasants Sandstone Member
Enumerated_Domain:
Enumerated_Domain_Value: Kwps1
Enumerated_Domain_Value_Definition: Williams Formation, Pleasants Sandstone Member, coarse-grained conglomeratic sandstone
Enumerated_Domain:
Enumerated_Domain_Value: Kwsr
Enumerated_Domain_Value_Definition: Williams Formation, Schulz Ranch Member
Enumerated_Domain:
Enumerated_Domain_Value: Kwsru

Enumerated_Domain_Value_Definition: Williams Formation, Schulz Ranch Sandstone Member, conglomeratic sandstone
Enumerated_Domain:
Enumerated_Domain_Value: Kwsrl
Enumerated_Domain_Value_Definition: Williams Formation, Schulz Ranch Sandstone Member, siltstone interfingering with silty conglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Kwst
Enumerated_Domain_Value_Definition: Williams Formation, Starr Member
Enumerated_Domain:
Enumerated_Domain_Value: Kl
Enumerated_Domain_Value_Definition: Ladd Formation
Enumerated_Domain:
Enumerated_Domain_Value: Klhs
Enumerated_Domain_Value_Definition: Ladd Formation, Holz Shale Member
Enumerated_Domain:
Enumerated_Domain_Value: Klbc
Enumerated_Domain_Value_Definition: Ladd Formation, Baker Canyon Conglomerate Member
Enumerated_Domain:
Enumerated_Domain_Value: Ktr
Enumerated_Domain_Value_Definition: Trabuco Formation
Enumerated_Domain:
Enumerated_Domain_Value: Ktru
Enumerated_Domain_Value_Definition: Trabuco Formation, conglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Ktrl
Enumerated_Domain_Value_Definition: Trabuco Formation, fanglomerate
Enumerated_Domain:
Enumerated_Domain_Value: Klct
Enumerated_Domain_Value_Definition: Tonalite of Lamb Canyon, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kmeg
Enumerated_Domain_Value_Definition: Granite of Mount Eden, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kthgd
Enumerated_Domain_Value_Definition: Granodiorite of Tucalota Hills, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klt
Enumerated_Domain_Value_Definition: Tonalite near mouth of Laborde Canyon, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Khqd
Enumerated_Domain_Value_Definition: Hypersthene quartz diorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Ktcg
Enumerated_Domain_Value_Definition: Monzogranite of Tres Cerritos, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klmp
Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, pegmatite dikes, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klmt
Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klml

Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, leucocratic rocks, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klmm
Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, melanocratic rocks, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klmtg
Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, Lakeview Mountains tonalite and granodiorite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klmc
Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, comb-layered gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klmg
Enumerated_Domain_Value_Definition: Lakeview Mountains pluton, hypersthene-hornblende gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Krct
Enumerated_Domain_Value_Definition: Tonalite of Reinhardt Canyon pluton, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbpg
Enumerated_Domain_Value_Definition: Monzogranite of Bernasconi Pass, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbpm
Enumerated_Domain_Value_Definition: Migmatitic rocks within monzogranite of Bernasconi Pass, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Ktbh
Enumerated_Domain_Value_Definition: Tonalite of Bernasconi Hills, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kp
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, granitic pegmatite dikes, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbt
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, biotite tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbfg
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, biotite granodiorite and tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbfgi
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, biotite granodiorite and tonalite containing abundant inclusions, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbhg
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, heterogeneous porphyritic granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbhg1

Enumerated_Domain_Value_Definition: Box Springs plutonic complex, layered heterogeneous porphyritic granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbg
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, porphyritic granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbft
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, biotite-hornblende tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbht
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, heterogeneous biotite tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kbgt
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, heterogeneous granodiorite and tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kba
Enumerated_Domain_Value_Definition: Box Springs plutonic complex, amphibolitic gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kvt
Enumerated_Domain_Value_Definition: Val Verde pluton, Val Verde tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kvtk
Enumerated_Domain_Value_Definition: Val Verde pluton, potassium feldspar-bearing tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kvti
Enumerated_Domain_Value_Definition: Val Verde pluton, inclusion-rich tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgr
Enumerated_Domain_Value_Definition: Granophyre, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgab
Enumerated_Domain_Value_Definition: Green Acres gabbroic complex, heterogeneous mixture of olivine, pyroxene, and hornblende gabbros, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgao
Enumerated_Domain_Value_Definition: Green Acres gabbroic complex, olivine gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgah
Enumerated_Domain_Value_Definition: Green Acres gabbroic complex, hornblende-rich gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgat
Enumerated_Domain_Value_Definition: Green Acres gabbroic complex, troctolite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgaa

Enumerated_Domain_Value_Definition: Green Acres gabbroic complex, anorthositic gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgam
Enumerated_Domain_Value_Definition: Green Acres gabbroic complex, metagabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgg
Enumerated_Domain_Value_Definition: Gavilan ring complex, hypersthene monzogranite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgt
Enumerated_Domain_Value_Definition: Gavilan ring complex, massive-textured tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgtf
Enumerated_Domain_Value_Definition: Gavilan ring complex, foliated tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgti
Enumerated_Domain_Value_Definition: Gavilan ring complex, tonalite containing abundant mesocratic inclusions, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgh
Enumerated_Domain_Value_Definition: Gavilan ring complex, hypabyssal tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgct
Enumerated_Domain_Value_Definition: Gavilan ring complex, coarse-grained biotite-hornblende tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kght
Enumerated_Domain_Value_Definition: Gavilan ring complex, heterogeneous tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kmp
Enumerated_Domain_Value_Definition: Micropegmatite granite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kmpc
Enumerated_Domain_Value_Definition: Micropegmatite and granodiorite of Cajalco pluton, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Ktd
Enumerated_Domain_Value_Definition: Tonalite dikes of Mount Rubidoux, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kmrg
Enumerated_Domain_Value_Definition: Granite of Mount Rubidoux, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Krg
Enumerated_Domain_Value_Definition: Granite of Riverside area, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kmhg
Enumerated_Domain_Value_Definition: Mount Hole Granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Klst

Enumerated_Domain_Value_Definition: La Sierra Tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Katg
Enumerated_Domain_Value_Definition: Granodiorite of Arroyo del Toro pluton, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kcto
Enumerated_Domain_Value_Definition: Cajalco pluton, tourmalinized monzogranite and granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kcg
Enumerated_Domain_Value_Definition: Cajalco pluton, monzogranite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kcgd
Enumerated_Domain_Value_Definition: Cajalco pluton, granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kct
Enumerated_Domain_Value_Definition: Cajalco pluton, tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kcgq
Enumerated_Domain_Value_Definition: Cajalco pluton, granodiorite and quartz latite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kcgb
Enumerated_Domain_Value_Definition: Cajalco pluton, granodiorite and gabbro, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kdvg
Enumerated_Domain_Value_Definition: Domenigoni Valley pluton, granodiorite to tonalite of Domenigoni Valley, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgbf
Enumerated_Domain_Value_Definition: Fine-grained hornblende gabbro, Rail Road Canyon area, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kpvgr

Enumerated_Domain_Value_Definition: Paloma Valley ring complex, granophyre, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kpvp
Enumerated_Domain_Value_Definition: Paloma Valley ring complex, pegmatite dikes of Paloma Valley ring complex, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kpvg
Enumerated_Domain_Value_Definition: Paloma Valley ring complex, monzogranite to granodiorite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kpvt
Enumerated_Domain_Value_Definition: Paloma Valley ring complex, tonalite, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kpvgb
Enumerated_Domain_Value_Definition: Paloma Valley ring complex, granodiorite and gabbro, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:

Enumerated_Domain_Value: Ksmg
Enumerated_Domain_Value_Definition: Monzogranite of Squaw Mountain, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kts
Enumerated_Domain_Value_Definition: Tonalite of Slaughterhouse Canyon, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kg
Enumerated_Domain_Value_Definition: Granitic dikes, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgu
Enumerated_Domain_Value_Definition: Granite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kmgt
Enumerated_Domain_Value_Definition: Monzogranite and tonalite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgd
Enumerated_Domain_Value_Definition: Granodiorite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kt
Enumerated_Domain_Value_Definition: Tonalite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Ktm
Enumerated_Domain_Value_Definition: Tonalite and mafic rocks, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kqd
Enumerated_Domain_Value_Definition: Quartz diorite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kdqd
Enumerated_Domain_Value_Definition: Diorite and quartz diorite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kd
Enumerated_Domain_Value_Definition: Diorite, undifferentiated, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Kgb
Enumerated_Domain_Value_Definition: Gabbro, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Khg
Enumerated_Domain_Value_Definition: Heterogeneous granitic rocks, Peninsular Ranges batholith
Enumerated_Domain:
Enumerated_Domain_Value: Ks
Enumerated_Domain_Value_Definition: Serpentinite
Enumerated_Domain:
Enumerated_Domain_Value: Kc
Enumerated_Domain_Value_Definition: Carbonate-silicate rock
Enumerated_Domain:
Enumerated_Domain_Value: Kvsp
Enumerated_Domain_Value_Definition: Santiago Peak Volcanics
Enumerated_Domain:
Enumerated_Domain_Value: Kvspi
Enumerated_Domain_Value_Definition: Intrusive rocks associated with Santiago Peak Volcanics

Enumerated_Domain:
Enumerated_Domain_Value: Kvem
Enumerated_Domain_Value_Definition: Estelle Mountain volcanics of Herzig (1991)
Enumerated_Domain:
Enumerated_Domain_Value: Kvr
Enumerated_Domain_Value_Definition: Rhyolite of Estelle Mountains volcanics of Herzig (1991)
Enumerated_Domain:
Enumerated_Domain_Value: Ksv
Enumerated_Domain_Value_Definition: Intermixed Estelle Mountain volcanics of Herzig (1991)
Enumerated_Domain:
Enumerated_Domain_Value: Kvs
Enumerated_Domain_Value_Definition: Intermixed Estelle Mountain volcanics of Herzig (1991) and Mesozoic sedimentary rocks
Enumerated_Domain:
Enumerated_Domain_Value: Mzmg
Enumerated_Domain_Value_Definition: Deformed granitic rocks of Transverse Ranges province, mylonitic and cataclastic granitic rocks
Enumerated_Domain:
Enumerated_Domain_Value: Mzdy
Enumerated_Domain_Value_Definition: Deformed granitic rocks of Transverse Ranges province, diorite, Yucaipa area
Enumerated_Domain:
Enumerated_Domain_Value: Jbc
Enumerated_Domain_Value_Definition: Bedford Canyon Formation
Enumerated_Domain:
Enumerated_Domain_Value: Jbc1
Enumerated_Domain_Value_Definition: Bedford Canyon Formation, Unit 1
Enumerated_Domain:
Enumerated_Domain_Value: Jbm
Enumerated_Domain_Value_Definition: Bedford Canyon Formation, marble and limestone
Enumerated_Domain:
Enumerated_Domain_Value: Mzu
Enumerated_Domain_Value_Definition: Mesozoic metasedimentary rocks, undifferentiated
Enumerated_Domain:
Enumerated_Domain_Value: Mzg
Enumerated_Domain_Value_Definition: Graywacke
Enumerated_Domain:
Enumerated_Domain_Value: Mzq
Enumerated_Domain_Value_Definition: Quartz-rich rocks
Enumerated_Domain:
Enumerated_Domain_Value: Mzqg
Enumerated_Domain_Value_Definition: Intermixed quartzite and graywacke
Enumerated_Domain:
Enumerated_Domain_Value: Mzgp
Enumerated_Domain_Value_Definition: Intermixed graywacke and phyllite
Enumerated_Domain:
Enumerated_Domain_Value: Mzp
Enumerated_Domain_Value_Definition: Phyllite
Enumerated_Domain:
Enumerated_Domain_Value: Mzs
Enumerated_Domain_Value_Definition: Schist
Enumerated_Domain:
Enumerated_Domain_Value: Mzm
Enumerated_Domain_Value_Definition: Marble
Enumerated_Domain:
Enumerated_Domain_Value: Mzi

Enumerated_Domain_Value_Definition: Interlayered phyllite (or schist) and quartzite
Enumerated_Domain:
Enumerated_Domain_Value: Mza
Enumerated_Domain_Value_Definition: Amphibolite
Enumerated_Domain:
Enumerated_Domain_Value: Mzsgn
Enumerated_Domain_Value_Definition: Mixed low metamorphic grade and upper amphibolite grade rocks
Enumerated_Domain:
Enumerated_Domain_Value: Mzds
Enumerated_Domain_Value_Definition: Mixed low metamorphic grade and upper amphibolite grade rocks, metadunite and serpentinite
Enumerated_Domain:
Enumerated_Domain_Value: Mzsm
Enumerated_Domain_Value_Definition: Mixed low metamorphic grade and upper amphibolite grade rocks, serpentinized metadunite containing magnesite veins
Enumerated_Domain:
Enumerated_Domain_Value: Mzdx
Enumerated_Domain_Value_Definition: Mixed low metamorphic grade and upper amphibolite grade rocks, amphibole- and pyroxene-bearing rocks associated with metadunite-serpentinite
Enumerated_Domain:
Enumerated_Domain_Value: Mzdc
Enumerated_Domain_Value_Definition: Mixed low metamorphic grade and upper amphibolite grade rocks, marble associated with metadunite
Enumerated_Domain:
Enumerated_Domain_Value: Mzgn
Enumerated_Domain_Value_Definition: Biotite gneiss and schist
Enumerated_Domain:
Enumerated_Domain_Value: KgMz
Enumerated_Domain_Value_Definition: Intermixed Mesozoic schist and Cretaceous granitic rocks
Enumerated_Domain:
Enumerated_Domain_Value: KgPz
Enumerated_Domain_Value_Definition: Intermixed Paleozoic(?) schist and Cretaceous granitic rocks
Enumerated_Domain:
Enumerated_Domain_Value: Pzu
Enumerated_Domain_Value_Definition: Paleozoic(?) rocks, undifferentiated
Enumerated_Domain:
Enumerated_Domain_Value: m
Enumerated_Domain_Value_Definition: Paleozoic(?) rocks, undifferentiated, marble
Enumerated_Domain:
Enumerated_Domain_Value: Pzs
Enumerated_Domain_Value_Definition: Biotite schist
Enumerated_Domain:
Enumerated_Domain_Value: Pzq
Enumerated_Domain_Value_Definition: Impure quartzite
Enumerated_Domain:
Enumerated_Domain_Value: Pzm
Enumerated_Domain_Value_Definition: Marble
Enumerated_Domain:
Enumerated_Domain_Value: Pzc
Enumerated_Domain_Value_Definition: Calc-silicate rocks
Enumerated_Domain:
Enumerated_Domain_Value: Pzms
Enumerated_Domain_Value_Definition: Marble and schist, undifferentiated
Attribute:

Attribute_Label: PLABL
Attribute_Definition: geologic map unit label, in coded text, used for plotting special characters contained in the geofont.txt textset (the geofont.txt textset must be used for these characters to be displayed correctly)
Attribute:
Attribute_Label: SHD
Attribute_Definition: Coded integer value that relates units to cartographic shades in shadeset wpgcmykg.shd
Attribute:
Attribute_Label: SHDFIL
Attribute_Definition: Coded integer value that relates units to cartographic patterns in shadeset geoscamp2.shd
Detailed_Description:
Entity_Type:
Entity_Type_Label: sa2_geo.aat
Entity_Type_Definition: Line types (LTYPE), and numbers corresponding to line symbols (L-SYMB) used for plotting contacts, faults, etc. identified in the Santa Ana 30' X 60' quadrangle
Attribute:
Attribute_Label: LTYPE
Attribute_Definition: Description of types of lines on the geologic map (contact, fault, dike)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: contact, certain
Enumerated_Domain_Value: contact, approx. located
Enumerated_Domain_Value: map boundary
Enumerated_Domain_Value: fault, certain
Enumerated_Domain_Value: fault, approx. located
Enumerated_Domain_Value: fault, inferred
Enumerated_Domain_Value: fault, approx. located, queried
Enumerated_Domain_Value: fault, concealed
Enumerated_Domain_Value: thrust fault, certain
Enumerated_Domain_Value: thrust fault, approx. located
Enumerated_Domain_Value: thrust fault, concealed
Enumerated_Domain_Value: normal fault, certain
Enumerated_Domain_Value: normal fault, approx. located
Enumerated_Domain_Value: normal fault, concealed
Enumerated_Domain_Value: fault scarp, certain
Enumerated_Domain_Value: fault scarp, approx. located
Enumerated_Domain_Value: landslide scarp, certain
Enumerated_Domain_Value: subsidence scarp
Enumerated_Domain_Value: ground fissure
Enumerated_Domain_Value: suture
Enumerated_Domain_Value: Kp, granitic pegmatite dike
Enumerated_Domain_Value: Kcto, zone of tourmalinized monzogranite
Enumerated_Domain_Value: Kgbd, gabbroic dike
Enumerated_Domain_Value: Kld, quartz latite dike
Enumerated_Domain_Value: Klmp, granitic pegmatite dike
Enumerated_Domain_Value: Kgbf, fine-grained hornblende gabbro dike
Enumerated_Domain_Value: Kpvp, pegmatite dike
Enumerated_Domain_Value: Kg, granitic dike
Enumerated_Domain_Value: Kvspi, porphyritic dike
Enumerated_Domain_Value: Mzmn, manganese bearing rock
Enumerated_Domain_Value: scratch boundary
Attribute:
Attribute_Label: L-SYMB

Attribute_Definition: Coded integer value that relates line to cartographic line symbol in lineset geoscamp2.lin
Detailed_Description:
Entity_Type:
Entity_Type_Label: sa2_str.pat
Entity_Type_Definition: Geological point data includes site-specific information describing the types and the orientation of foliation, joints, and lineations. One annotation subclass is included in the geologic points coverage, SA2_STR which displays the respective dip and plunge values associated with individual point data.
Attribute:
Attribute_Label: PTTYPE
Attribute_Definition: describes type of point data (foliation, joints, lineations)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: bedding
Enumerated_Domain_Value: vertical bedding
Enumerated_Domain_Value: overturned bedding
Enumerated_Domain_Value: horizontal bedding
Enumerated_Domain_Value: metamorphic foliation
Enumerated_Domain_Value: vertical metamorphic foliation
Enumerated_Domain_Value: igneous foliation
Enumerated_Domain_Value: vertical igneous foliation
Enumerated_Domain_Value: lineation
Enumerated_Domain_Value: lineation at attitude
Enumerated_Domain_Value: dip of fault surface
Attribute:
Attribute_Label: PT-SYMB
Attribute_Definition: Coded integer value that relates point to cartographic point symbol in markerset geoscamp2.mrk
Attribute:
Attribute_Label: STRIKE
Attribute_Definition: Azimuthal strike of planar feature
Attribute:
Attribute_Label: DIP
Attribute_Definition: Dip of planar feature
Detailed_Description:
Entity_Type:
Entity_Type_Label: sa2_point.pat
Entity_Type_Definition: Point data includes site-specific information describing the types and the orientation of folds
Attribute:
Attribute_Label: PTTYPE
Attribute_Definition: describes type of cartographic point data used in plotting to indicate fold type (anticline, syncline)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: anticline symbol
Enumerated_Domain_Value: syncline symbol
Enumerated_Domain_Value: overturned anticline symbol
Enumerated_Domain_Value: overturned syncline symbol
Enumerated_Domain_Value: direction of plunge
Attribute:
Attribute_Label: PT-SYMB
Attribute_Definition: Coded integer value that relates point to cartographic point symbol in markerset geoscamp2.mrk
Attribute:

Attribute_Label: STRIKE
Attribute_Definition: Azimuthal strike of planar feature
Attribute:
Attribute_Label: DIP
Attribute_Definition: Dip of planar feature
Detailed_Description:
Entity_Type:
Entity_Type_Label: sa2_point.aat
Entity_Type_Definition: Line data includes site-specific information describing the types and the orientation of folds
Attribute:
Attribute_Label: LTYPE
Attribute_Definition: describes type of line data (anticline, syncline)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: anticline, certain
Enumerated_Domain_Value: anticline, concealed
Enumerated_Domain_Value: syncline, certain
Enumerated_Domain_Value: syncline, concealed
Enumerated_Domain_Value: overturned anticline, certain
Enumerated_Domain_Value: overturned syncline, certain
Attribute:
Attribute_Label: L-SYMB
Attribute_Definition: Coded integer value that relates line to cartographic line symbol in lineset geoscamp2.lin
Detailed_Description:
Entity_Type:
Entity_Type_Label: sa2_ano.aat
Entity_Type_Definition: annotation leaders
Attribute:
Attribute_Label: LTYPE
Attribute_Definition: Description of type of line in the annotation coverage
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: leader
Attribute:
Attribute_Label: L-SYMB
Attribute_Definition: Coded integer value (1) that relates arcs to cartographic line symbol in lineset geoscamp2.lin
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  Metadata_Review_Date: 20040317
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        Contact_Person: Kelly R. Bovard
      Contact_Position: Geologist
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      Contact_Electronic_Mail_Address: kbovard@usgs.gov
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