



Geologic map of the San Bernardino North 7.5' quadrangle, San Bernardino County , California

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Prepared in cooperation with
CALIFORNIA DIVISION OF MINES AND GEOLOGY

Open-File Report OF 01-131

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U. S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

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INTRODUCTION

General

Open-File Report OF 01-131 contains a digital geologic map database of the San Bernardino North 7.5' quadrangle, San Bernardino County, California that includes:

1. ARC/INFO (Environmental Systems Research Institute, <http://www.esri.com>) version 7.2.1 coverages of the various components of the geologic map
2. A PostScript file to plot the geologic map on a topographic base, and containing a Correlation of Map Units diagram, a Description of Map Units, an index map, and a regional structure map.
3. Portable Document Format (.pdf) files of:
 - a. This Readme; includes an Appendix, containing data found in sbnorth_met.txt.
 - b. The Description of Map Units identical to that found on the plot of the PostScript file.
 - c. The same graphic as plotted in 2 above. (Test plots from this .pdf do not produce 1:24,000-scale maps. Adobe Acrobat pagesize setting control map scale.)

The Correlation of Map Units and Description of Map Units is in the editorial format of USGS Miscellaneous Investigations Series (I-series) maps. Within the geologic map data package, map units are identified by standard geologic map criteria such as formation-name, age, and lithology. Even though this is an author-prepared report, every attempt has been made to closely adhere to the stratigraphic nomenclature of the U. S. Geological Survey. Descriptions of units can be obtained by viewing or plotting the .pdf file (3b above) or plotting the postscript file (2 above). If roads in some areas, especially forest roads that parallel topographic contours, do not show well on plots of the geologic map, we recommend use of the USGS San Bernardino North 7.5' topographic quadrangle in conjunction with the geologic map.

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/cgi-bin/publication?map-of> and are included in Appendix I of the 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 are extracted.

Data Package

All files listed below are in a compressed tar file named `sbnorth.tar.gz` (2.8MB); see section below titled, SOFTWARE UTILITIES.

<u>ARC/INFO interchange files</u>	<u>San Bernardino North files</u>	<u>Contains</u>
sbnorth_geo.e00	sbnorth_geo	Contacts, faults, geologic unit labels
sbnorth_str.e00	sbnorth_str	Attitudes and their dip values. Dip values plotted as annotation.
sbnorth_orn.e00	sbnorth_orn	Line ornamentation
sbnorth_ldr.e00	sbnorth_ldr	unit label leaders, fault names
lines.rel.e00	lines.rel	Line dictionary
points.rel.e00	points.rel	Point dictionary
scamp2.shd.e00	scamp2.shd	SCAMP shade set

The directory, `info/`, is produced in the process of importing interchange files to ARC coverages in ARC/INFO. The **sbnorth** (San Bernardino North) `info/` directory contains:

Feature Attribute tables

sbnorth_geo.pat	Polygon attribute table
sbnorth_geo.aat sbnorth_ldr.aat	Arc attribute tables
sbnorth_str.pat sbnorth_orn.pat	Point attribute tables

Additional tables

lines.rel	Dictionary, contains all SCAMP line codes (Matti and others, 1998a)
points.rel	Dictionary, contains all SCAMP point codes (Matti and others, 1998b)

<u>Raster file</u>	<u>Resultant image</u>	<u>Contains</u>
sbnorth.tif	San Bernardino North base map	Topographic base from 500dpi scan of USGS San Bernardino North 7.5' quadrangle, 1967 (monochromatic image)

Plot Package

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

<u>Compressed file</u>	<u>Resultant image</u>	<u>Contains</u>
sbnorth_map.ps.gz	sbnorth_map.ps	PostScript plot file of geologic map and CMU/DMU

PostScript files are compressed UNIX files requiring gzip to uncompress them.

The uncompressed PostScript file sbnorth.ps will plot a 1:24,000 scale, full color geologic map of the San Bernardino North quadrangle on a topographic base. A detailed CMU diagram, a DMU, and a regional structure map are included on the sheet. This sheet is in the editorial format of the U.S. Geological Survey's Miscellaneous Investigations (I) map series, and is approximately 45 X 32 inches in size. The map sheet has been successfully plotted on Hewlett-Packard large-format plotters, models HP650C, HP755CM, and HP2500C, selecting ARCH E as the paper size.

Other files

Readme.pdf	This document in .pdf format
sbnorth_map.pdf	Geologic map, DMU, CMU, and sketch maps

SOFTWARE UTILITIES

Files which have .gz file extension were compressed using gzip. Gzip utilities are available free of charge via the internet at the gzip home page, <http://www.gzip.org>

The data package is additionally bundled into a single tar (tape archive) file. Individual files must be extracted using a tar utility, available free of charge via the internet through links on the Common Internet File Formats page, <http://www.matisse.net/files/formats.html>. One such utility is WinZip, available at <http://www.winzip.com> (WinZip can also decompress files).

Files in the plot package have been prepared to produce optimum plots using the shade, and marker sets listed below. The marker, line and shade (pattern) sets may be obtained at the web site <http://wrgis.wr.usgs.gov/docs/ncgm/scamp/scamp.html>.

Geoage font group may be obtained at the following web site

Server:	onyx.wr.usgs.gov
UserID:	anonymous
Password:	Your e-mail address
Directory:	pub/wpg/supplies/geoage

geoscamp2.lin	Lines
geoscamp2.mrk	Points
scamp2.shd	Colors (included in data package)
geology2.shd	Patterns
Geoage font group	Geologic Age Symbols

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. Via the Web from Western Region Geologic Information Server. Go to the web page at <http://wrgis.wr.usgs.gov/open-file/of01-131> and follow the directions to download the files.
2. By anonymous ftp over the Internet from wrgis.wr.usgs.gov. The files are located in the directory /pub/open-file/of01-131. Be sure to use binary transfer mode.

HOW TO EXTRACT THE GEOLOGIC MAP DATABASE FROM THE TAR FILE

After downloading the files, they must be uncompressed using a gzip utility such as gzip itself or WinZip. The data files must then be extracted using a tar utility.

Digital database

<u>To do this</u>	<u>Type this at the Unix command prompt</u>
Make a 6 MB tar file named sbnorth.tar	gzip -d sbnorth.tar.gz (or use gzip utility of choice)
Go to the directory that will hold the directory sbnorth (if different from local_directory)	cd local_directory
Extract the sbnorth directory from the tar file	tar -xvfv {path to tar file} sbnorth.tar (or use tar utility of choice)

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

```
sbnorth/  
  sbnorth_geo.e00  
  sbnorth_pts.e00  
  sbnorth_orn.e00  
  sbnorth_ldr.e00  
  lines.rel.e00  
  points.rel.e00  
  scamp2.shd.e00  
  sbnorth.tif
```

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

Readme.pdf	This document in .pdf format
sbnorth_map.pdf	Geologic map, DMU, CMU, and sketch maps

PostScript plot files

Make a 20 MB uncompressed file, **sbnorth_map.ps** by typing gzip -d sbnorth_map.ps.gz (or use gzip utility of choice)

Portable Document Format (.pdf) files

PDF files are not stored as gzip 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, 1991). 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 and geologic compilation of geologic map

The geologic map was compiled from 1:24,000 geologic mapping on aerial photographs and topographic quadrangle maps, transferred visually to a base-stable cronoflex copy of the San Bernardino North 7.5' quadrangle, and the linework scribed from the cronoflex map. The scribe guide was used to make a 0.007"-thick blackline clear-film, which was scanned at 1200 DPI and auto-vectorized by Optronics Specialty Company, Northridge, California; minor hand-digitized additions were made at the USGS. Lines, points, and polygons were subsequently edited at the USGS using standard ARC/INFO commands. Digitizing and editing artifacts significant enough to display at a scale of 1:24,000 were corrected.

Base map

The base map image (sbnorth.tif, Geotiff format) was prepared by scanning a scale-stable clear film of the U.S Geological Survey, 1:24,000 San Bernardino North 7.5' quadrangle (1971) topographic map. Scanning was done using an Anatech Eagle 4080 monochrome 800 dpi scanner; at a resolution of 500 dpi. The raster scan was converted to a monochromatic image in ARC/INFO, and registered and rectified to the San Bernardino North 7.5' quadrangle. No elements of the base layer are attributed. The base map is provided for reference only.

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 1:24,000 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 some places, the resolution of the combined output will be limited by the lower resolution data.

Map accuracy standards

Until uniform National geologic map accuracy standards are developed and adopted, lines and points on SCAMP 1:24,000 scale geologic maps that are located to within 15 meters, relative to accurately located features on the base map, are considered to meet map accuracy standards. Dashed lines, indicated in the database coding as not meeting map accuracy standards, are generally located to within 30 meters, relative to accurately located features on the base map.

Database specifics

General—The map database consists of ARC/INFO format coverages which are stored in polyconic projection (Table 1), and a series of data tables. Digital tics define a 7.5-minute grid of latitude and longitude in the geologic coverages corresponding to the 7.5-minute tic grid on the topographic base map.

Table 1—Map Projection

Projection	Polyconic
Datum	NAD27
Zunits	No
Units	Meters
Spheroid	Clark 1866
X shift	0.0000000000
Y shift	0.0000000000
Parameters	-117 18 45 longitude of central meridian
	34 07 30 latitude of projection's origin
	0.00000 false easting (meters)
	0.00000 false northing (meters)

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. Although Version 1.0 of the San Bernardino North 7.5' quadrangle does not contain coded, detailed, geologic attribute data, the items L-TAG (lines) and P-TAG (structural point data) do serve as relate items allowing users to establish a relate environment with and access to complete descriptions of the geologic entities contained in the line and point dictionaries (Matti and others, 1998a, 1998b). The following is an example of how to establish a simple relate environment and the ARC/INFO dialogue the user will encounter:

At the Arc prompt, type: relate add

Dialogue for ADD

Relation name: alphanumeric name of relate you want to establish
 Table identifier: pathname or database table name of the related file
 Database name: name of the database in which the related file is stored
 Info item: the item name in an INFO data file from which the relate is performed
 Relate column: the field in the related table which is related to the INFO item
 Relate type: the type of relate performed—one of the following four: LINEAR, ORDERED, LINK, TABLE. LINEAR is the slowest, but the simplest to apply. (Please consult ARC/INFO online help topic such as 'working with tables' for help on selection of relate type)
 Relation access: the access rights to the related file: RW, or RO, or AUTO

Example (lines):

Arc: relate add
 Relation name: line_dictionary
 Table identifier: lines.rel
 Database name: info
 INFO item: l-tag
 Relate column: l-tag
 Relate type: linear
 Relate access: rw

Lines—Lines are recorded as strings of arcs and are described in an arc attribute (.aat). Complete lists of the line types (L-TAG) 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 table (details in Appendix I). Using a system developed under the Southern California Areal Mapping Project (SCAMP), geologic maps can be encoded with detailed, polygon-specific geologic information on a polygon-by-polygon basis, so that within a quadrangle, lateral variations in a particular map unit can be recorded in the map database. Detailed encoding of polygons is not available in this version of the San Bernardino North quadrangle, but may be in subsequent versions. For traditional descriptions of the map units, see the Portable Document Format file **sbnorth_map.pdf** or the Postscript map plot, **sbnorth_map.ps**. A list of all map units in the database is given in Appendix I.

Points— Point information (attitudes of planar and linear features, and line ornamentation) is recorded as coordinate and related information. Complete lists of the point types (P-TAG) 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

Matti, J.C., Powell, R.E., Miller, F.K., Kennedy, S.A., Ruppert, K.R., Morton, G.L., and Cossette, P.M., 1998a, Geologic-line attributes for digital geologic map databases produced by the Southern California Areal Mapping Project (SCAMP), Version 1.0: U.S.Geological Survey Open-File Report 97-861

Matti, J.C., Miller, F.K., Powell, R.E., Kennedy, S.A., Bunyapanasarn, T.P., Koukladas, Catherine, Hauser, R.M., and Cossette, P.M., 1998b, Geologic-point attributes for digital geologic map databases produced by the Southern California Areal Mapping Project (SCAMP), Version 1.0: U.S.Geological Survey Open-File Report 97-859

APPENDIX I

(Original metadata text)

Identification_Information:

Citation:

Citation_Information:

Originator: Fred K. Miller

Publication_Date: 2001

Title: Geologic Map of the San Bernardino North 7.5' quadrangle, San Bernardino County, California

Edition: Version 1.0

Geospatial_Data_Presentation_Form: vector digital data

Series_Information:

Series_Name: U.S. Geological Survey Open-File Report

Issue_Identification: USGS OF 01-131

Publication_Information:

Publication_Place: Menlo Park, California

Publisher: U.S. Geological Survey

Online_Linkage: URL: <http://geopubs.wr.usgs.gov/docs/wrgis/of01-131>

Description:

Abstract:

This data set maps and describes the geology of the San Bernardino North 7.5' quadrangle, San Bernardino County, California. Created using Environmental Systems Research Institute's ARC/INFO software, the data base consists of the following items: (1) a map coverage containing geologic contacts and units, (2) attribute tables for geologic units (polygons), contacts (arcs), and site-specific data (points). In addition, the data set includes the following graphic and text products: (1) A PostScript graphic plot-file containing the geologic map, topography, cultural data, a Correlation of Map Units (CMU) diagram, a Description of Map Units (DMU), an index map, a regional geologic and structure map, and a key for point and line symbols; (2) PDF files of this Readme (including the metadata file as an appendix), Description of Map Units (DMU), and the graphic produced by the PostScript plot file.

The geologic map covers a part of the southwestern San Bernardino Mountains and the northwestern San Bernardino basin. Granitic and metamorphic rocks underlie most of the mountain area, and a complex array of Quaternary deposits fill the basin. These two areas are separated by strands of the seismically active San Andreas Fault. Bedrock units in the San Bernardino Mountains are dominated by large Cretaceous and Jurassic granitic bodies, ranging in composition from monzogranite to monzodiorite, and include lesser Triassic monzonite. The younger of these granitic rocks intrude a complex assemblage of gneiss, marble, and granitic rock of probable early Mesozoic age; the relationship between these metamorphic rocks and the Triassic rocks is unknown. Spanning the Pleistocene in age, large and small alluvial bodies emerge from the San Bernardino Mountains, and fill the San Bernardino basin. In the southwestern part of the quadrangle, Cajon Wash carries sediments from both the San Bernardino and San Gabriel Mountains, and Lytle Creek heads in the eastern San Gabriel Mountains. Limited bedrock areas showing through the Quaternary sediments of the basin consist exclusively of Mesozoic Pelona Schist locally intruded by Tertiary dikes. Youthful-appearing fault scarps discontinuously mark the traces of the San Andreas Fault along the southern edge of the San Bernardino Mountains. Unnamed Tertiary sedimentary rocks are bounded by two strands of the fault between Badger Canyon and the east edge of the quadrangle. Young and old high-angle faults cut bedrock units within the San Bernardino Mountains, and the buried, seismically active San Jacinto Fault traverses the southwestern part of the quadrangle.

The geologic map database contains original U.S. Geological Survey data generated by detailed field observation and by interpretation of aerial photographs. This digital Open-File map supercedes an older analog Open-File map of the quadrangle, and includes extensive new data on the Quaternary deposits, and revises some fault and bedrock distribution within the San Bernardino Mountains. The digital map was compiled on a base-stable microfiche copy of the San Bernardino North 7.5' topographic base and then scanned. This scan was used to make a 0.007 mil blackline clear-film, which was scanned at 1200 DPI by Optronics Specialty Company, Northridge, California; minor hand-digitized additions were made at the USGS. Lines, points, and polygons were subsequently edited at the USGS using standard ARC/INFO commands. Digitizing and editing artifacts significant enough to display at a scale of 1:24,000 were corrected. Within the database, geologic contacts are represented as lines (arcs), geologic units as polygons, and site-specific data as points. Polygon, arc, and point attribute tables (.pat, .aat, and .pnt, respectively) uniquely identify each geologic datum.

Purpose:

The data set for the San Bernardino North 7.5' 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 Geographical 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.

The digital geologic map database for the San Bernardino North 7.5' quadrangle has been created as a general-purpose data set that is applicable to other land-related investigations in the earth and biological sciences. For example, it can be used for groundwater studies in the San Bernardino basin, and for mineral resource evaluation studies, animal and plant habitat studies, and soil studies in the San Bernardino National Forest. The database is not suitable for site-specific geologic evaluations.

Time_Period_of_Content:

Time_Period_Information:

Range_of_Dates/Times:

Beginning_Date: 19740401

Ending_Date: 19810801

Currentness_Reference: New data and previously published data

Status:

Progress: Complete

Maintenance_and_Update_Frequency: As needed

Spatial_Domain:

Bounding_Coordinates:

West_Bounding_Coordinate: -117.37509226

East_Bounding_Coordinate: -117.24990774

North_Bounding_Coordinate: 34.24999995

South_Bounding_Coordinate: 34.1249841

Keywords:

Theme:

Theme_Keyword_Thesaurus: None

Theme_Keyword: geologic map

Theme_Keyword: geology

Theme_Keyword: bedrock geology

Theme_Keyword: surficial geology

Theme_Keyword: San Andreas Fault

Theme_Keyword: Triassic monzonite

Theme_Keyword: Jurassic granitic rocks

Theme_Keyword: Pelona Schist

Place:

Place_Keyword_Thesaurus: None

Place_Keyword: California

Place_Keyword: San Bernardino County

Place_Keyword: San Bernardino North 7.5' quadrangle

Access_Constraints: None

Use_Constraints:

The San Bernardino North 7.5' geologic-map database should be used to evaluate and understand the geologic character of the San Bernardino North 7.5' 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 geologic materials and structures. However, it is not sufficiently detailed for site-specific determinations.

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 1:24,000 means that higher resolution information may not have been uniformly retained in the dataset. Plotting at scales larger than 1:24,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, although higher resolution data is incorporated in parts 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: Fred K. Miller

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Contact_Position: Project geologist

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Data_Set_Credit:

Technical review by D. M. Morton led to significant improvements that eventually were reflected in aspects of the database, the plot file, and in the description of the geologic units of the San Bernardino North 7.5' quadrangle.

Geologic mapping and digital preparation of this report were sponsored jointly by (1) the National Cooperative Geologic Mapping Program of the U.S. Geological Survey, (2) the California Division of Mines and Geology, and (3) the Southern California Areal Mapping Project (SCAMP). In our digital preparation of the data set, carried out in the Geographic Information System laboratory of the Mineral Resources Program of the U.S. Geological Survey in Spokane, Washington by Pamela M. Cossette, we received valuable assistance from Paul C. Hyndman in Spokane, Washington, and from Rachel Hauser at the SCAMP Geographic Information System laboratory in Riverside, California.

Native_Data_Set_Environment:

SunOS, 5.7, sun4u UNIX

ARC/INFO version 7.2.1

Cross_Reference:

Citation_Information:

Originator: Fred K. Miller

Publication_Date: 1979

Title: Geologic map of the San Bernardino North quadrangle, California

Geospatial_Data_Presentation_Form: analog (paper) map

Series_Information:

Series_Name: Open-File

Issue_Identification: OF 79-770

Publication_Information:

Publication_Place: Menlo Park, California
Publisher: U.S. Geological Survey

Data_Quality_Information:

Attribute_Accuracy:

Attribute_Accuracy_Report:

Geologic-map units in the San Bernardino North 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 1:24,000-scale geologic maps produced by the project.

Geologic lines and points on 1:24,000 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.

Lines and points that meet (or may not meet) this SCAMP internal map-accuracy standard are identified both in the digital database and on derivative geologic-map plots. Within the database, line and point data that are judged to meet the SCAMP internal map-accuracy standard are denoted by the attribute code .MEE. (meets) in the appropriate data table; line and point data that may not meet the SCAMP internal map-accuracy standard are denoted by the attribute code .MNM. (may not meet).

On any derivative geologic-map plot, line data that are judged to meet the SCAMP internal map-accuracy standard are denoted by solid lines; line data that may not meet the SCAMP internal map-accuracy standard are denoted by dashed or dotted lines. There is no cartographic device for denoting the map-accuracy for geologic-point data (eg. 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 (Polyconic 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 and digital database of the San Bernardino North 7.5' quadrangle contain 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 7.5' quadrangle transformation and data input is 0.003 (7.6 meters). Horizontal positional accuracy was checked by visual comparison of hard-copy plots with base-stable source data.

Scale (X,Y) = (609.192,609.439) Skew (degrees) = (-0.010) Rotation (degrees) = (-0.047)
Translation = (-6429.281,-865.476) RMS Error (input,output) = (0.001,0.358)

Affine $X = Ax + By + C$
 $Y = Dx + Ey + F$
A = 609.191 B = 0.397 C = -6429.281
D = -0.504 E = 609.439 F = -865.476

Lineage:

Process_Step:

Process_Description: Field mapping and aerial photograph interpretation; iterative process (F.K. Miller).

Process_Date: 1974 and 1978

Process_Step:

Process_Description:

Aerial photograph interpretation and limited field checking; iterative process (J.C. Matti).

Process_Date: 1981

Process_Step:

Process_Description:

Transfer of geologic linework and point data from field maps and aerial photographs to a scale-stable cartographic base of quadrangle (scribeguide) (F.K. Miller and J.C. Matti).

Process_Date: 1978 and 1981

Process_Step:

Process_Description:

The geologic map information was scanned (initial raster scan in MS-DOS TIF format, 1200 dots per inch) from a clear-film, right-reading, 0.007 mil thickness, base-stable blackline positive (made by contact photograph from a scribeguide) of the author-prepared geologic map at 1:24,000 scale. The raster scan was auto-vectorized by Optronics Specialty Company, Inc.

Process_Date: 1997

Process_Step:

Process_Description:

ARC/INFO database established; cleanup of auto-vectorizing artifacts; polygon, arc, and point attribute tables established using model developed for SCAMP coverages. Digitizing and editing artifacts significant enough to display at a scale of 1:24,000 were corrected (P.M. Cossette).

Process_Date: 1997

Process_Step:

Process_Description: Description of Map Units and Correlation of Map Units (F.K. Miller)

Process_Date: 1999-2000

Process_Step:

Process_Description:

First draft of metadata created by cossette using FGDCMETA.AML ver. 1.2 05/14/98 on ARC/INFO data set /pool5/b/pcossette/sbnorth/sbn0201

Process_Date: 20010201

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: 1100

SDTS_Point_and_Vector_Object_Type: String

Point_and_Vector_Object_Count: 2894

SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains

Point_and_Vector_Object_Count: 1101

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:

Planar:

Map_Projection:

Map_Projection_Name: Polyconic

Polyconic:

Longitude_of_Central_Meridian: -117.3125

Latitude_of_Projection_Origin: 34.1250

False_Easting: 0.00000

False_Northing: 0.00000

Planar_Coordinate_Information:

Planar_Coordinate_Encoding_Method: coordinate pair

Coordinate_Representation:

Abscissa_Resolution: 0.0010000000474

Ordinate_Resolution: 0.0010000000474

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 1.0 of the San Bernardino North 7.5' quadrangle comprises four ARC/INFO coverages, of which two contain geologic data and two contain cartographic features: sbnorth_geo (geology), sbnorth_str (structural point data), sbnorth_orn (structural line ornamentation), and sbnorth_ldr (annotation leaders). Two INFO tables, lines.rel and points.rel provide a full description of each of the geologic line and point features in the database. A full source citation is provided in the Entity_and Attribute_Detail_Citation section of this metadata document.

Geologic data represented by line entities and the polygons they delineate are contained in the coverage SBNORTH_GEO. For display purposes, the geology coverage contains two annotation subclasses: anno.geo contains unit labels, and anno.fault contains formal, fault names.

Geological point data includes site-specific information describing the types and the orientation of bedding, foliation, and lineations. One annotation subclass is included in the geologic points coverage, SBNORTH_ATTITUDE: anno.dip displays the respective dip and plunge values associated with individual point data.

Entity_and_Attribute_Detail_Citation:

A complete description of the polygon, line, and point data coding schemes is available in U.S. Geological Survey Open-File Reports OFR 97-859, OFR 97-860, and OFR 97-861 (full source citations follow):

Matti, J.C., Miller, F.K., Powell, R.E., Kennedy, S.A., Bunyapanasarn, T.P., Koukladas, Catherine, Hauser, R.M., and Cossette, P.M., 1997b, Geologic-point attributes for digital geologic-map databases produced by the Southern California Areal Mapping Project (SCAMP), Version 1.0: U.S. Geological Survey Open-File Report 97-859

Matti, J.C., Miller, F.K., Powell, R.E., Kennedy, S.A., and Cossette, P.M., 1997c, Geologic-polygon attributes for digital geologic-map databases produced by the Southern California Areal Mapping Project (SCAMP), Version 1.0: U.S. Geological Survey Open-File Report 97-860

Matti, J.C., Powell, R.E., Miller, F.K., Kennedy, S.A., Ruppert, K.R., Morton, G.L., and Cossette, P.M., 1997a, Geologic-line attributes for digital geologic-map databases produced by the Southern California Areal Mapping Project (SCAMP), Version 1.0: U.S.Geological Survey Open-File Report 97-861

Detailed_Description:

Entity_Type:

Entity_Type_Label: sbnorth.pat

Entity_Type_Definition:

Geologic units (LABL) and their corresponding names (NAME) identified in the San Bernardino North 7.5'quadrangle

Attribute:

Attribute_Label: LABL

Attribute_Definition: geologic map unit label, in plain text

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: Qw

Enumerated_Domain_Value_Definition: Modern wash deposits

Enumerated_Domain:

Enumerated_Domain_Value: Qw2

Enumerated_Domain_Value_Definition: Modern wash deposits, Unit 2

Enumerated_Domain:

Enumerated_Domain_Value: Qw1

Enumerated_Domain_Value_Definition: Modern wash deposits, Unit 1

Enumerated_Domain:

Enumerated_Domain_Value: Qf

Enumerated_Domain_Value_Definition: Modern alluvial-fan deposits

Enumerated_Domain:

Enumerated_Domain_Value: Qf1

Enumerated_Domain_Value_Definition: Modern alluvial-fan deposits, Unit 1

Enumerated_Domain:

Enumerated_Domain_Value: Qc

Enumerated_Domain_Value_Definition: Modern colluvial deposits

Enumerated_Domain:

Enumerated_Domain_Value: Qt

Enumerated_Domain_Value_Definition: Modern talus deposits

Enumerated_Domain:

Enumerated_Domain_Value: Qls

Enumerated_Domain_Value_Definition: Modern landslide deposits

Enumerated_Domain:

Enumerated_Domain_Value: Qs

Enumerated_Domain_Value_Definition: Modern surficial deposits, undifferentiated

Enumerated_Domain:

Enumerated_Domain_Value: Qyf

Enumerated_Domain_Value_Definition: Young alluvial-fan deposits

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: Qya5
Enumerated_Domain_Value_Definition: Young alluvial-valley deposits, Unit 5

Enumerated_Domain:
Enumerated_Domain_Value: Qya4
Enumerated_Domain_Value_Definition: Young alluvial-valley deposits, Unit 4

Enumerated_Domain:
Enumerated_Domain_Value: Qya3
Enumerated_Domain_Value_Definition: Young alluvial-valley deposits, Unit 3

Enumerated_Domain:
Enumerated_Domain_Value: Qyls
Enumerated_Domain_Value_Definition: Young landslide deposits

Enumerated_Domain:
Enumerated_Domain_Value: Qof
Enumerated_Domain_Value_Definition: Old alluvial-fan deposits

Enumerated_Domain:
Enumerated_Domain_Value: Qof3
Enumerated_Domain_Value_Definition: Old alluvial-fan deposits, Unit 3

Enumerated_Domain:
Enumerated_Domain_Value: Qof2
Enumerated_Domain_Value_Definition: Old alluvial-fan deposits, Unit 2

Enumerated_Domain:
Enumerated_Domain_Value: Qols
Enumerated_Domain_Value_Definition: Old landslide deposits

Enumerated_Domain:
Enumerated_Domain_Value: Qoe
Enumerated_Domain_Value_Definition: Old eolian deposits

Enumerated_Domain:
Enumerated_Domain_Value: Qos
Enumerated_Domain_Value_Definition: Old surficial deposits, undifferentiated

Enumerated_Domain:
Enumerated_Domain_Value: Qvof3
Enumerated_Domain_Value_Definition: Very old alluvial-fan deposits, Unit 3

Enumerated_Domain:
Enumerated_Domain_Value: Qvof2
Enumerated_Domain_Value_Definition: Very old alluvial-fan deposits, Unit 2

Enumerated_Domain:
Enumerated_Domain_Value: Qvof1
Enumerated_Domain_Value_Definition: Very old alluvial-fan deposits, Unit 1

Enumerated_Domain:
Enumerated_Domain_Value: Qvols
Enumerated_Domain_Value_Definition: Very old landslide deposits

Enumerated_Domain:
Enumerated_Domain_Value: Tc
Enumerated_Domain_Value_Definition: Conglomerate and arkose

Enumerated_Domain:
Enumerated_Domain_Value: Tcc
Enumerated_Domain_Value_Definition: Conglomerate of Crestline

Enumerated_Domain:
Enumerated_Domain_Value: Tgr
Enumerated_Domain_Value_Definition: Hypabyssal granitic dikes

Enumerated_Domain:
Enumerated_Domain_Value: Kmg

Enumerated_Domain_Value_Definition: Biotite monzogranite
Enumerated_Domain:
Enumerated_Domain_Value: Mzps
Enumerated_Domain_Value_Definition: Pelona Schist
Enumerated_Domain:
Enumerated_Domain_Value: Mzgr
Enumerated_Domain_Value_Definition: Granitic rocks, undivided
Enumerated_Domain:
Enumerated_Domain_Value: Mzlg
Enumerated_Domain_Value_Definition: Granodiorite of Lake Gregory
Enumerated_Domain:
Enumerated_Domain_Value: Mzc
Enumerated_Domain_Value_Definition: Quartz monzonite of Crestline
Enumerated_Domain:
Enumerated_Domain_Value: Mzdc
Enumerated_Domain_Value_Definition: Gneiss of Devils Canyon
Enumerated_Domain:
Enumerated_Domain_Value: Ja
Enumerated_Domain_Value_Definition: Granodiorite of Arrowhead Peak
Enumerated_Domain:
Enumerated_Domain_Value: Trcp
Enumerated_Domain_Value_Definition: Monzonite of Cedarpines Park
Enumerated_Domain:
Enumerated_Domain_Value: Pzcu
Enumerated_Domain_Value_Definition: Carbonate rocks

Attribute:

Attribute_Label: PLABL

Attribute_Definition:

Coded geologic map unit label used to generate plot labels with relevant stratigraphic symbols. The geologic units with LABL designating Mesozoic (Mz), Triassic (Tr), and Paleozoic (Pz) have keystroke substitute characters, }, ^, and | respectively, that call their corresponding symbols from the Geogage Font Group. Geologic map unit labels will plot on derivative map plots with appropriate stratigraphic symbols if PLABL is used as the source for unit labels. The Geogage Font Group is accessed through geofont.txt. The Geogage Font Group and relevant information are available from the Web at: URL:
<http://geopubs.wr.usgs.gov/open-file/of99-430/>

Attribute:

Attribute_Label: SHDPS

Attribute_Definition: polygon color (as integer value) from shadeset scamp2.shd (included in the data package)

Attribute:

Attribute_Label: SHDFIL

Attribute_Definition: polygon fill pattern (as integer value) from shadeset geology2.shd

Attribute:

Attribute_Label: NAME

Attribute_Definition: Geologic name of map unit (see list under LABL attribute)

Detailed_Description:

Entity_Type:

Entity_Type_Label: sbnorth_geo.aat

Entity_Type_Definition:

Geologic features such as contacts and faults that bound rock-unit polygons (a complete description of each line type is available in the data table, lines.rel.)

Attribute:

Attribute_Label: L-SYMB

Attribute_Definition: stores appropriate line symbol value from the lineset geoscamp2.lin

Attribute:

Attribute_Label: L-TAG

Attribute_Definition:

Coded alpha-numerical symbol that relates arc to definition of line type in dictionary look-up table (lines.rel). For description of attributes in line classification dictionary, refer to USGS Open-File Report 97-861 (see Entity_and_Attribute_Detail_Citation)

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: C1

Enumerated_Domain_Value_Definition: Contact, generic, location meets map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C2

Enumerated_Domain_Value_Definition: Contact, generic, location may not meet map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C17

Enumerated_Domain_Value_Definition: Contact, landslide, location meets map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C18

Enumerated_Domain_Value_Definition: Contact, landslide, location may not meet map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C29

Enumerated_Domain_Value_Definition: Contact, sedimentary, location meets map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C30

Enumerated_Domain_Value_Definition: Contact, sedimentary, location may not meet map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C31

Enumerated_Domain_Value_Definition: Contact, sedimentary, inferred, location may not meet map accuracy

standard

Enumerated_Domain:

Enumerated_Domain_Value: C37

Enumerated_Domain_Value_Definition:

Contact, sedimentary, separates terraced alluvial units, location meets map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C49

Enumerated_Domain_Value_Definition: Contact, igneous, location meets map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C50

Enumerated_Domain_Value_Definition: Contact, igneous, location may not meet map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C51

Enumerated_Domain_Value_Definition: Contact, igneous, inferred, location may not meet map accuracy

standard

Enumerated_Domain:

Enumerated_Domain_Value: C54

Enumerated_Domain_Value_Definition:

Contact, igneous, identity questionable, inferred, location may not meet map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C65

Enumerated_Domain_Value_Definition: Contact, metamorphic, location meets map accuracy standard

Enumerated_Domain:

Enumerated_Domain_Value: C99

Enumerated_Domain_Value_Definition: Contact, igneous, scratch boundary

Enumerated_Domain:

Enumerated_Domain_Value: CL1

Enumerated_Domain_Value_Definition: Cartographic line, map boundary

Enumerated_Domain:
Enumerated_Domain_Value: F1
Enumerated_Domain_Value_Definition: Fault, high angle, slip unspecified, generic, location meets map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F2
Enumerated_Domain_Value_Definition: Fault, high angle, strike slip, right lateral, location meets map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F5
Enumerated_Domain_Value_Definition: Fault, high angle, reverse slip, location meets map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F7
Enumerated_Domain_Value_Definition: Fault, high angle, slip unspecified, location meets map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F8
Enumerated_Domain_Value_Definition: Fault, high angle, slip unspecified, location may not meet map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F11
Enumerated_Domain_Value_Definition: Fault, high angle, reverse slip, location may not meet map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F13
Enumerated_Domain_Value_Definition: Fault, high angle, strike slip, right lateral, location may not meet map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F14
Enumerated_Domain_Value_Definition:
Fault, high angle, strike slip, right lateral, inferred, location may not meet map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F19
Enumerated_Domain_Value_Definition:
Fault, high angle, slip unspecified, inferred beneath mapped covering unit, location may not meet map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F20
Enumerated_Domain_Value_Definition:
Fault, high angle, strike slip, right lateral, inferred beneath mapped covering unit, location may not meet map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F53
Enumerated_Domain_Value_Definition: Fault, high angle, reverse slip, scarp, location meets map accuracy standard

Enumerated_Domain:
Enumerated_Domain_Value: F54
Enumerated_Domain_Value_Definition: Fault, high angle, oblique slip, scarp, location meets map accuracy standard

Attribute:
Attribute_Label: L-NAME
Attribute_Definition: Formal name of fault

Detailed_Description:
Entity_Type:
Entity_Type_Label: sbnorth_str.pat

Entity_Type_Definition:

Geological point data includes site-specific information describing the types and the orientation of bedding, foliation, and lineations. One annotation subclass is included in the geologic points coverage, SBNORTH_STR: anno.attitude displays the respective dip and plunge values associated with individual point data.

Attribute:

Attribute_Label: P-TAG

Attribute_Definition:

Coded alpha-numerical value that relates point entity to definition of point type in dictionary INFO table, points.rel. For description of attributes in point classification dictionary, refer to USGS Open-File Report 97-859 (see

Entity_and_Attribute_Detail_Citation)

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: B2

Enumerated_Domain_Value_Definition: Bedding, inclined, sedimentary rocks

Enumerated_Domain:

Enumerated_Domain_Value: B7

Enumerated_Domain_Value_Definition: Bedding, overturned, sedimentary rocks

Enumerated_Domain:

Enumerated_Domain_Value: FN42

Enumerated_Domain_Value_Definition: Foliation, metamorphic, inclined

Enumerated_Domain:

Enumerated_Domain_Value: L1

Enumerated_Domain_Value_Definition: Lineation, origin not determined

Enumerated_Domain:

Enumerated_Domain_Value: L22

Enumerated_Domain_Value_Definition: Lineation, metamorphic, aligned minerals

Enumerated_Domain:

Enumerated_Domain_Value: L37

Enumerated_Domain_Value_Definition: Lineation, metamorphic, minor fold axes

Attribute:

Attribute_Label: P-SYMB

Attribute_Definition:

Coded integer value that relates point to cartographic point symbol in markerset geoscamp2.mrk

Attribute:

Attribute_Label: P-STRIKE

Attribute_Definition: Azimuthal strike of planar feature

Attribute:

Attribute_Label: P-DIP

Attribute_Definition: Dip of planar feature

Attribute:

Attribute_Label: P-DIPDIR

Attribute_Definition: Azimuthal direction of dip of planar feature

Attribute:

Attribute_Label: P-PLUNGE

Attribute_Definition: Plunge of linear feature

Attribute:

Attribute_Label: P-BEARING

Attribute_Definition: Azimuthal direction of plunge of linear feature

Attribute:

Attribute_Label: P-SOURCE

Attribute_Definition: Source of data

Detailed_Description:

Entity_Type:

Entity_Type_Label: sbnorth_orn.pat
Entity_Type_Definition: Line ornamentation

Attribute:

Attribute_Label: P-TAG

Attribute_Definition:

Coded alpha-numerical value that relates point to definition of point type in dictionary INFO table, points.rel. For description of attributes in point classification dictionary, refer to USGS Open-File Report 97-859 (see Entity_and_Attribute_Detail_Citation)

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: FC2

Enumerated_Domain_Value_Definition: Fault attribute, strike slip arrows, right lateral

Enumerated_Domain:

Enumerated_Domain_Value: FC4

Enumerated_Domain_Value_Definition: Fault dip, direction and amount

Attribute:

Attribute_Label: P-SYMB

Attribute_Definition:

Coded integer symbol that relates point to cartographic point symbol in markerset geoscamp2.mrk

Detailed_Description:

Entity_Type:

Entity_Type_Label: sbnorth_ldr.pat

Entity_Type_Definition: Annotation leaders

Attribute:

Attribute_Label: P-SYMB

Attribute_Definition:

Coded integer value (1) that relates arcs to cartographic line symbol in lineset geoscamp2.lin

Distribution_Information:

Distributor:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: U.S. Geological Survey Information Services

Contact_Address:

Address_Type: mailing address

Address: Box 25286 Denver Federal Center

City: Denver

State_or_Province: CO

Postal_Code: 80225

Country: USA

Contact_Voice_Telephone: 303-202-4700

Contact_Facsimile_Telephone: 303-202-4693

Distribution_Liability:

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This digital, geologic map database of the San Bernardino North 7.5' quadrangle, 1:24,000 map-scale, and any derivative maps thereof, is not meant to be used or displayed at any scale larger than 1:24,000 (e.g., 1:12,000).

Metadata_Reference_Information:

Metadata_Date: 20010518

Metadata_Review_Date: 2001

Metadata_Contact:

Contact_Information:

Contact_Organization_Primary:

Contact_Organization: U.S. Geological Survey

Contact_Person: Pamela M. Cossette

Contact_Position: Geographer

Contact_Address:

Address_Type: mailing address

Address:

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Postal_Code: 99201-1087

Country: USA

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Contact_Facsimile_Telephone: 509-368-3199

Contact_Electronic_Mail_Address: pcossette@usgs.gov

Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata_Standard_Version: Version of June 8, 1994

Metadata_Access_Constraints: none

Metadata_Use_Constraints: none