Geologic Map of the Sheep Hole Mountains 30'x60' quadrangle, San Bernardino and Riverside Counties, California

By Keith A. Howard[1]

Readme and metadata to accompany
Miscellaneous Field Investigations MF-2344

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U.S. Geological Survey

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Contents

Introduction

General

Miscellaneous Field Investigations Map MF-2344 when originally released in 2002 did not include the files that comprise the spatial database. By updating the data package, the author has made those files available in the digital geologic map database for the Sheep Hole Mountains 30' x 60' quadrangle. The dataset includes:

1. ARC/INFO (Environmental Systems Research Institute, http://www.esri.com) version 8.1 (service pack 1) geospatial coverages (in interchange file format .e00) of the various components of the geologic map database, supporting INFO tables (in interchange file format .e00) and a tarred and zipped folder containing Southern California Areal Mapping Project (SCAMP) and U.S. Geological Survey symbol sets used to display the geologic data.

2. Encapsulated PostScript Files (.eps) to plot two sheets:
   a. Sheet1 includes the geologic map, cross sections, base data, a discussion of the geology and structural evolution, a tabulation of drill holes along with a list of references.
   b. Sheet2 shows the Correlation of map Units (CMU), the Description of Map Units (DMU), modal diagrams for granitoid rocks, and an explanation for point and line symbols.

3. Portable Document (508-compliant) Format (.pdf) files of:
   a. This Readme; including in Appendix I, a copy of shp_met.txt
   b. The same sheets as described in 2 above.

Geologic mapping, compilation and digital preparation of this report were sponsored jointly by (1) the National Cooperative Geologic Mapping Program of the USGS as contributions to the National Geologic Map Database , and (2) the Bureau of Land Management Wilderness, Reactor Hazards, Deep Continental Studies.

The digital geologic map database for the Sheep Hole Mountains 30' x 60'' quadrangle has been created as a general-purpose data set that is applicable to other land-related investigations in the earth and biological sciences. The database is not suitable for site-specific geologic evaluations.

This Readme document describes the digital data, such as types and general contents of files that comprise the database and includes information on how to extract and plot the map sheet. Metadata information can be accessed at http://geo-nsdi.er.usgs.gov/cgi-bin/publication/open-file and are included in Appendix I

How To Obtain Paper Plots

For those having access to large-format plotters such as HP2500, plots may be made directly from the included plot files. For those needing paper plots of the geologic map and accompanying text, but who do not have access to large-format plotters, please contact the U.S. Geological Survey Print-on-demand facility.

USGS Information Services
Box 25286
Denver Federal Center
Denver, CO 80225-0046
(303) 202-4200
1-800-USA-MAPS
FAX: (303) 202-4695
e-mail: *infoservices@usgs.gov*

How To Obtain The Digital Files

The export files, and subsequently the data and plot files, constituting the geologic map database of this Miscellaneous Field Studies Map may be obtained in several ways:

a. over the Internet via the Web from the Western Region Geologic Information Server: http://geopubs.wr.usgs.gov/docs/wrgis/mf2344
b. by anonymous ftp over the Internet from wrgis.wr.usgs.gov. The files are located in *http://geopubs.wr.usgs.gov/docs/wrgis/mf-map.html*

Database Contents

Data Package

The files constituting the geologic map database of this Miscellaneous Field Studies Map are listed below, Table 1, along with the interchange files from which they may be extracted and are contained in a compressed, tarred and zipped file, **shpmtn.tar.gz**; see section below titled, *SOFTWARE UTILITIES*.

Table 1

INTERCHANGE FILES	COVERAGES, INFO TABLES AFTER IMPORT	CONTENTS
shph_geo1.e00	shph_geo1	Geologic units and structural data
shph_geo2.e00	shph_geo2	Structural data, dikes, and section lines
shph_str.e00	shph_str	Structural point data
shph_well.e00	shph_well	Well data
shp_anno.e00	shp_anno	Few geologic unit label annotation and leaders
shp_geo.lut.e00	shp_geo.lut	Lookup table: rock unit data
shp_lines.lut.e00	shp_lines.lut	Lookup table: linear features including dikes and faults data
shp_pts.lut.e00	shp_pts.lut	Lookup table: geologic structural point data

An additional folder, symbols.zip, is included in the data package which contains symbol sets and fonts which may be useful in preparing derivative products. The original symbol sets used to produce the final map plot are no longer in use. Consequently, the user may be required to update and/or modify the digital data with respect to the application of the lookup (.lut) tables.

Plot Package

The files have been successfully plotted on Hewlett-Packard large-format plotters, models HP2500C, and HP5000PS.

Other Files

This document in .pdf format, readme.pdf and Federal Geographic Data Committee (FGDC) metadata, shph_met.html.

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 and line sets may be obtained from the included symbols folder or from the web site http://wrgis.wr.usgs.gov/docs/wgmt/scamp/html/sc_gis.html (fonts that are essential to the ability to utilize the SCAMP symbol sets are included in the symbols folder).
GeoAge Symbol Font Family is similarly included in the symbols folder.

Once all the compressed files have been uncompressed, the ARC interchange (.e00) format files must be imported into the Sheep Hole Mountains directory, shpmtn/, that was created during the uncompress process. 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.

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.

Digital Geologic Map Specifications

Base Map

Base scanned by National Mapping Division (NMD) from USGS Sheep Hole Mountains 1:100,000 topgraphic sheet, 1985; Transverse Mercator Projection

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 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.

Database Specifics

The spatial database files are in ARC/INFO coverage (ARC/INFO vector) format, in UTM27 projection. Please see Appendix I, metadata: Section – *Spatial Reference Information*.

Literature Cited

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

Appendix I

Identification_Information:

Citation:
Citation_Information:
Originator: Keith A. Howard
Publication_Date: 2002
Title:
Geologic Map of the Sheep Hole Mountains 30'x 60' quadrangle, San Bernardino and Riverside Counties, California
Edition: Version 1
Geospatial_Data_Presentation_Form: map
Series_Information:
Series_Name: U.S. Geological Survey Miscellaneous Field Investigations
Issue_Identification: USGS MF-2344
Publication_Information:
Publication_Place: Menlo Park, California
Publisher: U.S. Geological Survey
Online_Linkage: URL:http://geopubs.wr.usgs.gov/docs/wrgis/mfmap.html
Description:

Abstract:
This data set describes and maps the geology of the Sheep Hole Mountains 30' x 60' quadrangle in southern California. The quadrangle covers an area of the Mojave Desert characterized by desert ranges separated by broad basins. Ranges include parts of the Old Woman, Ship, Iron, Coxcomb, Pinto, Bullion, and Calumet mountains as well as Lead Mountain and the Kilbeck Hills. Basins include part of Ward Valley, part of Cadiz Valley including Cadiz Lake playa, and broad valleys occupied by the Bristol Lake and Dale Lake playas. Bedrock geologic units in the ranges range in age from Proterozoic to Quaternary. The valleys expose Neogene and Quaternary deposits.

Proterozoic granitoids in the quadrangle include the Early Proterozoic Fenner Gneiss, Kilbeck Gneiss, Dog Wash Gneiss, granite of Joshua Tree, the (highly peraluminous granite) gneiss of Dry Lakes valley, and a Middle Proterozoic granite. Proterozoic supracrustal rocks include the Pinto Gneiss of Miller (1938) and the quartzite of Pinto Mountain. Early Proterozoic orogeny left an imprint of metamorphic mineral assemblages and fabrics in the older rocks.

A Cambrian to Triassic sequence deposited on the continental shelf lies above a profound nonconformity developed on the Proterozoic rocks. Small metamorphosed remnants of this sequence in the quadrangle include rocks correlated to the Tapeats, Bright Angel, Bonanza King, Redwall, Bird Spring, Hermit, Coconino, Kaibab, and Moenkopi formations. The Dale Lake Volcanics (Jurassic), and the McCoy Mountains Formation of Miller (1944)(Cretaceous and Jurassic?) are younger Mesozoic synorogenic supracrustal rocks in the quadrangle.

Mesozoic intrusions form much of the bedrock in the quadrangle, and represent a succession of magmatic arcs. The oldest rock is the Early Triassic quartz monzonite of Twentynine Palms. Extensive Jurassic

magmatism is represented by large expanses of granitoids that range in composition from gabbro to syenogranite. They include the Virginia May Quartz Monzonite and other members of the Bullion Intrusive Suite, the Chubbock Porphyry, and rocks that form the Goat Basin pluton, Music Valley pluton, and Ship Mountains pluton. The Jurassic plutons range in emplacement depths from mid-crustal to hypabysasal. Mafic and felsic dikes that probably are part of the Late Jurassic Independence dike swarm intrude the Jurassic batholithic rocks.

A Mesozoic ductile fault (tectonic slide), the Scanlon thrust, places an inverted sequence of lower Paleozoic rocks and their Proterozoic basement over a lower plate of younger Paleozoic and Triassic rocks. The lower- plate rocks are internally sliced and folded. They in turn are superposed along an attenuation tectonic slide, the Kilbeck fault, over highly strained tectonic schist. The major tectonic slides and associated fabrics are cut by Late Cretaceous batholithic rocks.

Widespread Late Cretaceous granitoids assigned to the Cadiz Valley batholith and the Old-Woman Piute Range batholith together form a contiguous super-unit of granite and granodiorite compositions. The Old- Woman Piute Range batholith includes the granite of Sweetwater Wash in the Painted Rock pluton and the Old Woman Mountains Granodiorite forming the Old Woman pluton. The large Cadiz Valley batholith is divided into the Iron Mountains Intrusive Suite and the Coxcomb Intrusive Suite. The Iron Mountains Intrusive Suite includes the Granite Pass Granite (which forms the Granite Pass pluton), the Danby Lake Granite Gneiss, and the Iron Granodiorite Gneiss. The Coxcomb Intrusive Suite consists of many units including the Clarks Pass Granodiorite, the Sheep Hole Mountains Granodiorite (forms the Sheep Hole Mountains pluton), and the Sheep Hole Pass Granite (forms the Sheep Hole Pass pluton). The Cretaceous rocks were emplaced at a range of deep to shallow depths, and their intrusion resulted in an aureole 2-3 km wide in older rocks. Mylonitic fabrics developed through a thickness of >1.3 km, together with screens of tectonic schist, record ductile deformation associated with or immediately following batholith emplacement in a plutonic roof zone in the Iron Mountains. Post-plutonic Late Cretaceous mylonitic fabrics were also produced by extensional unroofing off both the western and eastern flanks of the incipient Old Woman Mountains.

A nonconformity above the Cretaceous rocks represents a period of deep erosion and nondeposition before lower Miocene volcanic and clastic rocks were deposited. Early Miocene magmatism is recorded by basanitoid, basalt, and dacite flows as well as dacitic intrusions of a lacolith, a stock, and the Bullion Mountains dike swarm. This magmatism coincided with early Miocene tectonic extensional tilting of rocks in the Calumet Mountains. Younger Neogene deposits of conglomerate, gravel, and breccia, and the demarcation of many of the modern ranges in the quadrangle, probably relate to strike-slip faulting and block rotations in the eastern California shear zone. This zone includes northwest- striking dextral faults and east-striking sinistral faults in the western part of the quadrangle. Faults active in Quaternary time include the Calumet fault, West Calumet fault, Dry Lakes fault, Sheep Hole fault, Cleghorn Lakes fault, Cleghorn Pass fault, Ivanhoe fault, Old Dale fault, Humbug Mountain fault, Dog Wash fault, Twentynine Palms Mountain fault, Pinto Mountain fault, Mesquite Lake fault, and two faults that exhibit Holocene movement, the West Valley Mountain fault and the East Valley Mountain fault.

Late Pliocene basalt in the Deadman Lake volcanic field and Quaternary basalt in the Amboy Crater lava flow and a flow near Lead Mountain record the youngest volcanism. Quaternary surficial deposits of alluvium, playa deposits, and windblown sand underlie more than half the quadrangle. Twentynine drill holes deeper than 100 m have penetrated the surficial deposits. Mapped sand dune crests strike mostly east to southeast. Brine and salt have been commercially exploited from the playas.

Purpose:
The data set for the Sheep Hole Mountains 30' x 60' quadrangle has been created and prepared by the U.S. Geological Survey (USGS) National Cooperative Geologic Mapping Program through the Needles 1 x 2 degree Geologic Mapping Project, the Pacific to Arizona Crustal Experiment (PACE), and the Southern California Areal Mapping Project (SCAMP). The database is designed to form part of a regional Geographic Information System (GIS) database as a contribution to the National Geologic Map Data Base of the National Cooperative Geologic Mapping Program.

The digital geologic map database has been created as a general purpose data set that is applicable to broad land-related investigation in the earth and biological sciences. For example, it can be used for mineral resource evaluation studies, animal and plant habitat studies, studies of regional fault hazards, ground-water studies, and soil and surficial geology studies in the California Desert Conservation Area and in Joshua Tree National Park. The database is not suitable for site-specific geologic evaluations.

Supplemental_Information:
This dataset was initially released by the USGS as MF2344 (2002) which consisted of two map sheets without the digital, spatial database files from which the maps were derived: sheet1 presenting the geologic map and related information and sheet2 displaying the Correlation of Map Units (CMU) and Description of Map Units (DMU). In order to make the digital data available to the public, the author has updated the original MF release by including the digital data files from that original effort.

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1979
Ending_Date: 1995
Currentness_Reference: New data

Status:
Progress: Complete
Maintenance_and_Update_Frequency: As needed

Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -116.00589714
East_Bounding_Coordinate: -114.98813326
North_Bounding_Coordinate: 34.51231252
South_Bounding_Coordinate: 33.98780915

Keywords:
Theme:

Theme_Keyword_Thesaurus: None
Theme_Keyword: geologic map
Theme_Keyword: geology
Theme_Keyword: bedrock geology
Theme_Keyword: surficial geology
Theme_Keyword: extensional tectonics
Theme_Keyword: Colorado River extensional corridor
Theme_Keyword: Scanlon thrust
Theme_Keyword: Cadiz Valley batholith
Theme_Keyword: Eastern California shear zone
Theme_Keyword: Mojave Desert
Theme_Keyword: Mylonitic
Place:
Place_Keyword_Thesaurus: None
Place_Keyword: California
Place_Keyword: San Bernardino and Riverside Counties
Place_Keyword: Sheep Hole Mountains 30' x 60' quadrangle
Place_Keyword: Mojave Desert
Place_Keyword: Cadiz Lake playa

Stratum:
Stratum_Keyword_Thesaurus: None
Stratum_Keyword: Bullion Intrusive Suite
Stratum_Keyword: Coxcomb Intrusive Suite
Stratum_Keyword: Iron Intrusive Suite
Temporal:
Temporal_Keyword_Thesaurus: None
Temporal_Keyword: Proterozoic
Temporal_Keyword: Paleozoic
Temporal_Keyword: Mesozoic
Temporal_Keyword: Cenozoic
Access_Constraints: None
Use_Constraints:
The Sheep Hole 30' x 60' geologic-map database should be used to evaluate and understand the geologic character of the Sheep Hole 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 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 1:100,000 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.

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Contact_Information:
Contact_Person_Primary:
Contact_Person: Keith A. Howard
Contact_Organization: U.S. Geological Survey, Western Region

Contact_Position: Research geologist
Contact_Address:
Address_Type: mailing address
Address:
U.S. Geological Survey
345 Middlefield Road
City: Menlo Park
State_or_Province: California
Postal_Code: 94025
Country: United States of America
Contact_Voice_Telephone: 650 329 4943
Contact_Facsimile_Telephone: 650 329 5299
Contact_Electronic_Mail_Address: khoward@usgs.gov

Data_Set_Credit:
Geoff Phelps, (USGS) prepared the digital files and database from which the map plot was prepared; technical reviews by Roland Tabor and Robert Powell (USGS).

Geologic mapping, compilation and digital preparation of this report were sponsored jointly by (1) the National Cooperative Geologic Mapping Program of the U.S. Geological Survey, and (2) the Bureau of Land Management Wilderness, Reactor Hazards, Deep Continental Studies.
Native_Data_Set_Environment: ARC/INFO version 6.1

Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report:
Geologic-map units in the Sheep Hole Mountains quadrangle database were described using standard field methods. Consistent with these methods, the database authors have assigned standard geologic attributes to geologic lines, points, and polygons identified in the database.
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 and digital database of the Sheep Hole Mountains 30'x 60' quadrangle contain 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 area.
Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The maximum transformation RMS error acceptable for 30' x 60' 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.
Lineage:
Source_Information:
Source_Citation:
Citation_Information:

Originator: J.P. Calzia
Originator: J.E. Kilburn
Originator: R.W. Simpson Jr.
Originator: C.M. Allen
Originator: A.M. Leszcykowski
Originator: J.D. Causey
Publication_Date: 1983
Title:
Mineral resource potential map of the Coxcomb Mountains Wilderness Study Area (CDCA- 328), San Bernardino and Riverside Counties, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Miscellaneous Field Studies
Issue_Identification: MF-1603-A
Other_Citation_Details: scale 1:62,500

Source_Information:
Source_Citation:
Citation_Information:
Originator: D.M. Miller
Originator: K.A. Howard
Publication_Date: 1985
Title:
Bedrock geologic map of the Iron Mountains quadrangle, San Bernardino and Riverside Counties, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Miscellaneous Filed Studies
Issue_Identification: MF-1736
Other_Citation_Details: scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: K.A. Howard
Originator: C.M. Allen
Publication_Date: 1988
Title:
Geologic map of the southern part of the Dale Lake 15-minute quadrangle, San Bernardino and Riverside Counties, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Open-file Report
Issue_Identification: 88- 534
Other_Citation_Details: scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: K.A. Howard
Originator: B.E. John
Publication_Date: 1984
Title:
Geologic map of the Sheep Hole-Cadiz Wilderness Study Area (CDCA-305), San Bernardino County, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Miscellaneous Field Studies
Issue_Identification: 1615-A

Other_Citation_Details: scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: K.A. Howard
Originator: John Bacheller
Originator: T.T. Fitzgibbon
Originator: R.E. Powell
Originator: C.M. Allen
Publication_Date: In press
Title:
Geologic map of the Valley Mountain 15-minute quadrangle, San Bernardino and Riverside Counties, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Open-file Report
Issue_Identification: 95-548
Other_Citation_Details: scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: K.A. Howard
Originator: E.D. Horringa
Originator: D.M. Miller
Originator: Paul Stone
Publication_Date: 1989
Title:
Geologic map of the eastern parts of the Cadiz Lake and Cadiz Valley 15-minute quadrangles, San Bernardino and Riverside Counties, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Miscellaneous Field Studies
Issue_Identification: MF-2086
Other_Citation_Details: scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: K.A. Howard
Originator: K.J. Jagiello
Originator: T.T. Fitzgibbon
Originator: B.E. John
Publication_Date: In press
Title:
Geologic map of the Lead Mountain 15-minute quadrangle, San Bernardino County, California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Open-file Report
Issue_Identification: 95-552
Other_Citation_Details: scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: D.H. Kupfer
Originator: A.M. Bassett
Publication_Date: 1962
Title:
Geologic reconnaissance map of part of the southeastern Mojave Desert,

California
Geospatial_Data_Presentation_Form: Map
Series_Information:
Series_Name: U.S. Geological Survey Mineral Investigations Field Studies
Issue_Identification: MF-205
Other_Citation_Details: scale 1:125,000
Source_Information:
Source_Citation:
Citation_Information:
Originator: K.J. Jagiello
Publication_Date: 1991
Title:
Determination of horizontal separation on late Cenozoic strike-slip faults in the central Mojave Desert, southern California:
Series_Information:
Series_Name: PhD. dissertation
Publication_Information:
Publication_Place: Los Angeles
Publisher: University of California at Los Angeles
Other_Citation_Details: 293 p. map scale 1:62,500
Source_Information:
Source_Citation:
Citation_Information:
Originator: M.R. Rosen
Publication_Date: 1991
Title:
Sedimentologic and geochemical constraints on the hydrogeologic evolution of Bristol Dry Lake Basin, California, USA
Series_Information:
Series_Name: Palaeogeography, Palaeoclimatology, Palaeoecology
Issue_Identification: v. 84
Other_Citation_Details: p. 229- 257
Process_Step:
Process_Description:
The map was compiled chiefly from geologic maps of eight 1:62,500 blocks that represented parts of or combinations of constituent 15' quadrangles. Much of the original mapping on which these previously prepared maps were based (Howard and Allen, 1988; Howard and John, 1984; Miller and Howard, 1985; Howard et al, 1989a,b, in press a,b) had been drafted originally on 7.5' orthophotoquadrangles at 1:24,000 scale. These blocks were mapped chiefly at 1:24,000 scale, but the detail of the mapping was governed by the intention that it was to be compiled at 1:62,500 scale. These blocks had been reduced and mosaicked to 1:62,500 scale by photographic or (for Howard et al., in press a,b) digital methods for the cited publications.

Preparation for 1:100,000 scale entailed necessary simplification in some areas, combining of some geologic units, definition of several new geologic names, and addition of new geologic and photogeologic mapping. Most geologic detail from the 1:24,000 maps is retained on the 1:100,000-scale map.

Process_Step:
Process_Description:
Digital compilation and map preparation was completed by G. Phelps (USGS Menlo Park) and D. Casebier (USGS Flagstaff) by October 2000. Base from USGS Sheep Hole Mountains 1:100,000 sheet.
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/pool1/cossette/khoward_data/shphole_spok/shp1
Process_Date: 20040205

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: 2893
SDTS_Point_and_Vector_Object_Type: String
Point_and_Vector_Object_Count: 7407
SDTS_Point_and_Vector_Object_Type: GT-polygon composed of chains
Point_and_Vector_Object_Count: 2894

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: 1.0
Longitude_of_Central_Meridian: -115.30
Latitude_of_Projection_Origin: 34.00
False_Easting: 0
False_Northing: 0
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 1.0
Ordinate_Resolution: 1.0
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:
Created using Environmental Systems Research Institute's ARC/INFO software,
the updated version 1.0 of the Sheep Hole Mountains 30' x 60' quadrangle
comprises five ARC/INFO coverages, of which four contain geologic data, and
one contains cartographic features: shph_geo1 (geologic units and
structural data), shph_geo2 (structural data, dikes and section lines),
shph_str (structural point data), shph_well (well data), and shp_anno
(selective geologic unit annotation). Line and point identities are
recorded in the .aat and .pat tables using a brief system of identity codes
and descriptions. Three lookup tables contain data that facilitate
plotting: shp_geo.lut (rock unit data), shp_lines.lut (linear geologic
features including dikes and faults), shp_pts.lut (geologic structural
point data).

In addition, the data set includes the following graphic and text

products: (1) an Encapsulated PostScript File (.eps), sheet1, containing the geologic map and cross sections, base data, a discussion of the geolgy including a geologic summary and a section on structural evolution, a tabulation of drill holes, and a list of references; (2) a .pdf version of sheet1; (3) sheet 2(.eps), showing the Correlation of Map Units (CMU), the Description of Map Units (DMU), modal diagrams for granitoid rocks, and an explanation for point and line symbols; (4) a .pdf version of sheet2; (5) a Readme (.pdf) file, and (6) this metadata file.

The original map plot was prepared using symbol sets that are no longer commonly used by the USGS. Consequently, look-up tables would require updating in order to implement USGS symbol sets that meet Federal Geographic Data Committee (FGDC) approval.

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This digital, geologic map database of the Sheep Hole Mountains 30' x 60' quadrangle, 1:100,000 map-scale, and any derivative maps thereof, is not meant to be used or displayed at any scale larger than 1:100,000 (e.g., 1:24,000).

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