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Open-File Report 97-693

PRELIMINARY GEOLOGIC MAP OF THE LITTLE PIUTE MOUNTAINS, CALIFORNIA: A DIGITAL DATABASE

By: Keith A. Howard, Michael L. Dennis, Karl Karlstrom, and Geoffrey A. Phelps

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figure 1 figure1.gif (22 KB)

figure 2 figure2.gif (8 KB)

figure 3 figure3.gif (8 KB)

Download the database package in ARC/INFO 7.x uncompressed export format along with supporting materials in a compressed UNIX tar file (see the database explanation pamphlet for details): of97-693.tar.gz (3.1 MB compressed download file, 14 MB when uncompressed)

Download two Postscript plottable files, plates 1 and 2 of the open-file, at a scale of 1:10,000, in a compressed UNIX tar file (see the database explanation pamphlet for details): plots.tar.gz (1.5 MB compressed download file, 12 MB when uncompressed)


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

PRELIMINARY GEOLOGIC MAP OF THE LITTLE PIUTE MOUNTAINS, SAN BERNARDINO COUNTY, CALIFORNIA: A DIGITAL DATABASE

By

Keith A. Howard, Michael L. Dennis, Karl Karlstrom, and
Geoffrey A. Phelps

Open - File Report 97-693

This database, identified as "Preliminary Geologic map of the Little Piute Mountains, California: A digital database," is the database from which the hard-copy map OF95-598, "Preliminary Geologic map of the Little Piute Mountains, California" was produced. It has been approved for release and publication by the Director of the USGS. Although this database has been subjected to rigorous review and is substantially complete, the USGS reserves the right to revise the data pursuant to further analysis and review. Furthermore, it is released on condition that neither the USGS nor the United States Government may be held liable for any damages resulting from its authorized or unauthorized use.

1995

Introduction

The Little Piute Mountains Digital database contains digital geologic and geographic information for the study area. The geology was mapped at a scale of 1:8,000, and the topographic information was input from the Little Piute Mountains, CA 1:24,000 quadrangle. The accuracy of the spatial information is limited to the input scale.

Postscript files, originally published in paper format as Open-file map 95-598, have been included for those who do not have access to a geographic information system. The files are equivalent to those which produced the hard-copy open file. They can be printed on any device equipped to print postscript files of the appropriate file size.

Geologic Summary

The Little Piute Mountains in the eastern Mojave Desert expose a series of folds and thrust faults involving metamorphosed Paleozoic strata (Miller and others, 1982; Stone and others, 1983). Detailed mapping of these structures was undertaken to help elucidate regional Mesozoic structural evolution. Earlier geologic maps were prepared by Cooksley(1960a,b,c,d, generalized by

Bishop, 1964) and Stone and others (1983).

Deformed and metamorphosed Paleozoic and Triassic rocks form a stratal succession that was originally deposited in shallow seas on the North American craton. Based on lithologic sequence the units are correlated with unmetamorphosed equivalents 200 km to the northeast in the Grand Canyon, Arizona, and 35-50 km to the west in the Marble, Ship, and Providence Mountains, California (Stone and others, 1983). The Paleozoic sequence rests nonconformably on a heterogeneous basement of polydeformed Early Proterozoic gneiss (Miller and others, 1982); Wooden and Miller, 1990). Triassic and older rocks were deformed, metamorphosed to staurolite or andalusite grade, and intruded concordantly at their base by Late Cretaceous granodiorite (Miller and others, 1992).

(from the Open-File report; references available in the complete report, available in html format as of95-598.html)

DATABASE CONTENTS

The digital database consists of the geologic map database itself and the supporting data, including a fault map, base maps, map explanation, geologic descriptions, symbolsets and references. All files except ASCII files are in Arc/Info Export format. This format can be read by many commercial GIS packages, and is a way to access the Arc/Info geodatasets without having the Arc/Info software.

Arc/Info Geodatasets:

The geologic map database consists of two ARC coverages:

lp_geo	Polygon coverage of geologic faults, contacts, geologic units of the Little Piute Mountains.
lp_str	Point coverage containing the structural information for the Little Piute Mountains. Point data includes planar and linear structural symbols (strike & dip), line data includes fold axes and lineaments. Annotion is included for the point symbols.

The database directory also includes the following supporting directories, ARC coverages, and files:

xsec_arc	Line coverage of the four cross-section lines used to make cross-sections A through D. Annotation for the ends of the cross-section lines is included.
lp_leadr	Line coverage of the annotation and annotation leaders for geologic unit annotation in the coverage lp_geo. Annotation is stored in the subclass units.
lp_hyp	line coverage of the hypsography for the Little Piute Mountains, with attached elevation database.
lp_hyd	line coverage of the hydrography for the Little Piute Mountains.
lp_base	Line coverage of the combined base layers for the Little Piute Mountains, no attached database. Annotation relevant to the base is stored in the subclass margin.
lp_tin	TIN (triangular irregular network) of the Little Piute Mountains constructed from a subset of elevation data from the lp_hyp coverage.

Cross-sections:

lpxs_a thru d	Polygon coverages of geologic cross-sections for the Little Piute Mountains, sections A through D, including geologic faults, contacts and units.
lpxs_a thru dan	Annotation coverage, including leaders, for the geologic cross-secion coverages A through D. Annotation is included in subclass margin.

Lookup tables (INFO files):

lppoly.lut	Lookup table for geologic units, to be used in conjunction with alc1.shd to reproduce the geologic unit colors of the open-file
lpline.lut	Lookup table for geologic lines, used to reproduce geologic line symbology of the open-file
lppoint.lut	Lookup table for geologic marers, used to reproduce geologic marker symboloby of the open-file

Symbolsets:

key.geology	Keyfile used by the program lp_plot.aml to create a list of geologic units present on the geologic map. This is not a correlation chart. For correlation chart information see the text accompanying the map.
fnt027	Geologic font which contains special geologic letters (e.g. Cambrian, Proterozoic)
fnt038	Geologic font which contains geologic point symbols (e.g. lineation, strike & dip, foliation)
fnt040	Geologic font which contains geologic markers that ornament geologic lines (e.g. teeth on faults)
alc1.shd	Arc/Info shadeset used to color geologic units
lpiute.lin	Arc/Info lineset used to symbolize lines of the open-file
geology.mrk	Arc/Info markerset used to symbolize points of the open-file
lpiute.txt	Arc/Info textset containing geologic letters, used to annotate geologic units on the open-file
fontsize.txt	Arc/Info textset used for map margin annotation

Files:

of95-598.html	HTML of the text portion of OF95-598, contianing geologic background, history, and unit descriptions. Figures accompanying the text are included as TIF files:
maplp.gif	GIF image of the location map of the Little Piute Mountains, figure 1, page 4, of the of95-598 text, linked to of95-598.html.
correlp.gif	GIF image of the correlation of map units for the Little Piute Mountains, linked to of95-598.html.
lineslp.tif	TIF image of the legend of lines and structure symbols for the Little Piute Mountains, not linked to of95-598.html.
readme	A text-only ASCII file containing database specifics.

(this document).

lpiute.ps — A Postscript plottable file containing an image of the geologic map of the Little Piute Mountains at a scale of 1:10,000 (OF 95-598 plate 1).

lp_xs.ps — A Postscript plottable file containing an image of the Little Piute Mountains cross-sections at a scale of 1:10,000 (OF 95-598 plate 2).

disclmr.fil — ASCII file that contains the standard open-file disclamer. This file is used as input by the plotting AMLs discussed below.

Programs:

The following programs were written in AML Arc/Info's macro language, to create plot files of the geologic database. The amls included will reproduce plates 1 and 2 of the open-file report. It is not necessary to run the programs in order to generate a postscript file (the postscript file can be downloaded separately). The AMLs are included for completeness. They can also serve as a reference guide for plotting any derivative map the user may wish to create using the available data.

lp_plot.aml — The program to create a duplicate of the open-file postscript plot plate 1, lpiute.ps.

lpx_plot.aml — The program to create a duplicate of the open-file postscript plot plate 2, lp_xs.ps.

plot_xs.aml — Program run by lpx_plot.aml.

padscale.aml — Program which creates a scale bar, run by both lp_plot.aml and lpx_plot.aml.

The database was compiled in ARC/INFO, a commercial Geographic Information System (Environmental Systems Research Institute, Redlands, California), and is stored in ARC coverage format (ARC/INFO version 7.0.3) in a UNIX tar file. A tar file utility is therefore required to extract the database from the tar file, and GIS software that can read the Arc/Info Export file format is required to access the geologic database information.

The digital compilation was done using versions 5.0.1 to 7.0.3 of ARC/INFO. Cross-section coverages were constructed with the help of version 3.0 of the menu interface ALACARTE (Fitzgibbon and Wentworth, 1991, Fitzgibbon, 1991, Wentworth and Fitzgibbon, 1991).

Postscript Plot Files

The database is in ARC coverage format, and therefore requires use of ARC/INFO or another compatible GIS system to access the information contained within it. For those interested in the geology of the Little Piute Mountains, but who don't use an ARC/INFO compatible GIS system, we have included both the postscript files for the hard-copy open-file (95-598). Two files are included:

lpiute.ps — -Geologic map, OF 95-598 PLATE 1
4.9 MB uncompressed postscript file

lp_xs.ps — -Geologic cross-sections,
OF 95-598 PLATE 2
1.02 MB uncompressed postscript file

Because this release is primarily a digital database, the plot files (and plots derived therefrom) have not been edited to conform to U.S. Geological Survey standards. Small units have not been labeled with leaders and in some instances map features or

annotation may overlap. However, sample plots by the authors have proven to be quite legible and useful.

compressed tar files

The data is stored in two tar files, compressed with the publicly available gzip utility. The contents and sizes of the tar files are as follows:

plots.tar.gz	gzip-ed tar file, 1.7 MB compressed, 12 MB uncompressed. Contains the files listed under the Files heading and the Postscript Plot Files heading.
of95-598.tar.gz	gzip-ed tar file, 3.4 MB compressed, 14 MB uncompressed. Contains the files listed under the headings Arc/Info Geodatasets, Lookup tables, Symbolsets, Programs, and all files except the postscript plot files.

OBTAINING DIGITAL DATA

An approximately 3.7 MB compressed (using the gzip utility) tar file of the database and related files can be obtained

1) from the U.S.G.S. Western Region Cooperative Geologic Mapping Program web site:
   http://wrgis.wr.usgs.gov
2) by anonymous ftp over Internet,
   ftp wrgis.wr.usgs.gov
3) by sending a tape to the U.S.G.S.

1) To obtain the tar file from the web site, do the following:
   open URL
   http://wrgis.wr.usgs.gov/docs/geologic/ca/of95-598/piute.html
   click on the datasets you would like to download

   WARNING!
   Make sure you have enough space for the download.

2) To obtain the tar file by ftp, log in to your UNIX system and do the following:

cd local_directory	-go to a directory to receive the tar file
ftp wrgis.wr.usgs.gov	-make ftp connection with the USGS computer WRGIS
Name: anonymous	-use "anonymous" as your user name
Password: your name	-use your own user name as password
cd pub/geologic	-go down to the pub directory
cd ca/of95-598	-go down to the open-file directory
type binary	-change transfer type to binary
get of95-598.tar.Z	-copy the compressed tar file across Internet to your directory
quit	-close the ftp connection

3) Send a tape with request and return address to:

   Little Piute Mountains Database
   c/o Keith Howard
   U.S. Geological Survey
   345 Middlefield Road, M/S 975
   Menlo Park, CA 94025

Do not omit any part of this address!

The compressed tar file will be returned on the tape. The acceptable tape types are:
7.0 GB, 8 mm Exabyte tape.

EXTRACTING THE DATABASE FROM A COMPRESSED TAPE ARCHIVE (tar) FILE:

If you obtained the database on tape:
put the tape in your tape drive

cd local_directory	-go to a directory to receive the tar file
tar xvfb /dev/rmt 20	-/dev/rmt is the tape device and 20 is the blocking factor; this puts the tar file in local_directory
gzip -d of95-598.tar.gz	-makes an 8.2 MB uncompressed tar file of95-598.tar
cd local_directory2	-go to the directory that will hold the workspace hfg (if different from local_directory)
tar xvfb {path to tar file}/of95-598.tar 20	-extract the hfg workspace from the tar file.

If you obtained the database by anonymous ftp:

gzip -d of95-598.tar.gz	-makes an 8.2 MB uncompressed tar file of95-598.tar
cd local_directory2	-go to the directory that will hold the workspace hfg (if different from local_directory)
tar xvfb {path to tar file}/of95-598.tar 20	-extract the hfg workspace from the tar file.

This process will create a directory "/of95-598" that contains the databases and supporting files as described above, in Arc/Info export format.

ARC/INFO EXPORT FILES

Database files (Arc/Info geodatasets and look-up tables) of the above datasets are stored in Arc/Info EXPORT format. These files can be recognized by the .e00 extension. Arc/Info EXPORT format is a format read by many GIS packages, and may be converted back to Arc/Info datasets using the IMPORT command. For converting the files into other commercial GIS packages, consult the package's documentation.

DIGITAL COMPILATION

System

Compilation of the geodatasets began in ARC5.0.1 and completed in ARC7.0.3. Tracing was done in ink onto stable base material (mylar) and scanned using a Tektronix 4991 monochrome scanner with a resolution of 304.8 dots per inch. The Tektronix 4991 vectorizes automatically, so no raster images were present. Digitizing was performed on a Calcomp 9100. The bulk of the work (after hardware upgrade) was performed on a SUN SPARC10 workstation running Solaris 2.3.

Projection

The geodatasets created for the Little Piute Mountains are in a common projection.

The projection of the map is as follows:

Projection	POLYCONIC		
Units	METERS	Spheroid	CLARKE1866
Parameters:			
longitude of central meridian			-115 3 45.00
latitude of projection's origin			34 37 30.000
false easting (meters)			0.00000
false northing (meters)			0.00000

This information can be obtained with the DESCRIBE command in ARC. The original base map did not have enough pre-defined latitude and longitude locations to define the map projection (it was an enlargement and therefore included only part of the original quadrangle base map), so the UTM grid, zone 11, locations were used as places to locate the "tics" for the geologic coverage. The UTM locations were converted to their polyconic equivalents using the PROJECT command in ARC, and the tics for the coverage were defined based on these locations. Subsequent digital datasets were registered to these tics.

Geologic Geodatasets

The geologic map information was scanned from a copy traced on stable base material (mylar) and updated by digitizing information from field maps. The input scale of the geologic map information is 1:8,000. The original base map, and the base map for the field sheets, was a 24,000 scale quadrangle map photo-enlarged to 1:8,000.

I) lp_geo

The geologic coverage lp_geo contains the geologic unit information for the Little Piute Mountains. It is a polygon coverage of geologic units bounded by unit-bounding lines (concealed faults are not included, since they are not unit-bounding lines). Line direction is significant for arcs which represent thrust faults. Annotation is not included in this coverage.

The AAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	FNODE#	4	5	B	-	
5	TNODE#	4	5	B	-	
9	LPOLY#	4	5	B	-	
13	RPOLY#	4	5	B	-	
17	LENGTH	4	12	F	3	
21	LPIUTE_GEO#	4	5	B	-	
25	LPIUTE_GEO-ID	4	5	B	-	
29	LTYPE	35	35	C	-	geologic line type
64	SEL	1	1	I	-	extra field
65	SYMB	3	3	I	-	extra field

The PAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	AREA	4	12	F	3	
5	PERIMETER	4	12	F	3	
9	LPIUTE_GEO#	4	5	B	-	
13	LPIUTE_GEO-ID	4	5	B	-	
17	PTYPE	35	35	C	-	geologic unit type

The PTYPE field contains the formation name. In many cases the formation name involves characters that are not in the standard keyboard character set e.g. Cambrian. Below is a chart of meta-characters used in place of the geologic characters. For example, in the PTYPE field, Triassic Moenkope formation is

coded as #m. To make database queries, search on the metacharacter according to the list below. A special textset, lpiute.txt, contains the geologic characters, and the meta-characters are mapped to them. This allows for the display of the geologic characters during plotting.

Proterozoic	&
Cambrian	{
Pennsylvanian	@
Triassic	#
Paleozoic	$
Mesozoic	}

II) lp_str

The structural information for the Little Piute Mountains is contained in the point coverage lp_str. Attitudes, stored as point locations, and structural lines (e.g. fold axes) were input by digitizing from the mylar base map and from field sheets. Attitudes store the strike or azimuth in a database field called STRIKE, and the dip or plunge in a database field called PLUNGE. The interpretation is dependent upon the type of attitude, stored in the PTTYPE (point type) field. The PAT has an elevation item associated with each point, obtained from the TIN. This elevation value was used to project the attitude information into the plane of the cross-sections.

The AAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	FNODE#	4	5	B	-	
5	TNODE#	4	5	B	-	
9	LPOLY#	4	5	B	-	
13	RPOLY#	4	5	B	-	
17	LENGTH	4	12	F	3	
21	LPIUTE_STR#	4	5	B	-	
25	LPIUTE_STR-ID	4	5	B	-	
29	LTYPE	35	35	C	-	geologic line type
64	SEL	1	1	I	-	extra field
65	SYMB	3	3	I	-	extra field

The PAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	AREA	4	12	F	3	
5	PERIMETER	4	12	F	3	
9	LPIUTE_STR#	4	5	B	-	
13	LPIUTE_STR-ID	4	5	B	-	
17	PTTYPE	35	35	C	-	
52	DIP	3	3	I	-	Attitude dip or plunge
55	STRIKE	3	3	I	-	Attitude strike or azimuth
58	SEL	1	1	I	-	extra field
59	SYMB	3	3	I	-	extra field
68	ELEV	4	12	F	3	Attitude elevation (derived from the TIN)

The transformation error is as follows:

Scale (X,Y) = (203.393,203.111) Translation = (-2036.147,6612.429)
Rotation (degrees) = (90.444) RMS Error (input,output) = (0.009,1.865)

ic id	input x / output x	input y / output y	x error	y error
1	27.638	31.856		
	4399.978	946.962	-0.650	-0.598
3	2.694	2.637		
	-1502.774	6061.464	-1.215	-0.531
4	3.022	32.136		
	4496.145	5945.997	-1.026	-0.478

5	2.854	17.402		
	1496.705	6003.730	1.923	0.187
6	17.460	2.466		
	-1560.489	3061.965	-1.672	0.148
7	17.619	17.241		
	1438.991	3004.270	3.685	1.213
8	17.785	31.966		
	4438.432	2946.576	-1.219	0.692
9	27.474	17.111		
	1400.537	1004.629	0.175	-0.632

III) cross-sections lpxs_a through lpxs_d

The cross-sections for the Little Piute Mountains were created from the digital geologic and hypsographic coverages using cross-section tools present in Alacarte. A topograhphic profile coverage, complete with geologic line and unit demarcations, is created in the projection of the geologic coverage. This coverage is treated as if it were x-z space, the "z" direction is the y direction of the projection. The section is placed near the projections origin such that the beginning of the section line is at the x-origin, and the y-axis represents the z-value of the topographic profile in meters above sea level. Height can therefore be measured directly in the coverage, as can distance from the begining of the cross-section line. Once the topographic profile and information regarding where the geologic units intersected the profile were created, the subsurface geology was interpreted by the geologists and added to the coverage by digitizing. The subsurface interpretation is constrained by surface information only.

The attribute tables are defined for the first cross-section coverage. They are identical for the remaining three coverages, except for the coverage name.

The AAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	FNODE#	4	5	B	-	
5	TNODE#	4	5	B	-	
9	LPOLY#	4	5	B	-	
13	RPOLY#	4	5	B	-	
17	LENGTH	4	12	F	3	
21	LPXS_A#	4	5	B	-	
25	LPXS_A-ID	4	5	B	-	
29	LTYPE	35	35	C	-	geologic line type
64	SEL	1	1	I	-	extra field

The PAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	AREA	4	12	F	3	
5	PERIMETER	4	12	F	3	
9	LPXS_A#	4	5	B	-	
13	LPXS_A-ID	4	5	B	-	
17	PTYPE	35	35	C	-	geologic unit type

Base Geodatasets

The original hard-copy base map was a mylar greenline of the lower east portion of the Little Piute Mountains 24,000 scale quadrangle, photo-enlarged to 1:8,000. The digital base information was obtained from film positives or tracings of this base.

I) lp_base

The composite base coverage was scanned and vectorized on a SCITEX scanner from a stable mylar copy of the 1:8,000 large-scale base map and delivered as a digital product to one of the authors (G. Phelps). The coverage has been projected and "clipped" slightly to match the final boundary of the Little Piute Mountains geologic layer. The base layer contains no attatched database informaion. The quality of the scan is generally poor and is provided for visual reference only.

Transformation error for lp_base

Scale (X,Y) = (203.356,203.104) Translation = (-1972.126,-72.326)
Rotation (degrees) = (0.024) RMS Error (input,output) = (0.005,1.113)

ic id	input x output x	input y output y	x error	y error
1	31.335	5.025		
	4399.978	946.962	-0.299	-0.005
2	1.834	5.584		
	-1598.944	1062.298	-0.755	-0.592
3	2.317	30.200		
	-1502.774	6061.464	-0.678	-0.144
4	31.813	29.636		
	4496.145	5945.997	-1.410	-0.427
5	17.079	29.921		
	1496.705	6003.730	1.699	0.365
6	2.028	15.434		
	-1560.489	3061.965	-0.596	0.359
7	16.790	15.152		
	1438.991	3004.270	1.889	0.101
8	31.528	14.870		
	4438.432	2946.576	-0.323	0.054
9	16.590	5.307		
	1400.537	1004.629	0.472	0.288

II) lp_hyp

The hypsography layer was traced in ink onto mylar from the 1:8,000 large-scale mylar base map, then scanned and transformed. A database was created and the lines were subsequently "tagged" according to their elevation. The elevation units are meters, the contour interval is 10 meters. The line database (lp_hyp.aat) contains two user-defined items: ELEV and SFTYPE. ELEV contains the elevation, in meters, and SFTYPE contains the surface feature type (used when creating surface models) and all lines are defined as 2, though the lines themselves were not used in the final version of the TIN.

The AAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	FNODE#	4	5	B	-	
5	TNODE#	4	5	B	-	
9	LPOLY#	4	5	B	-	
13	RPOLY#	4	5	B	-	
17	LENGTH	4	12	F	3	
21	LPIUTE_HYP#	4	5	B	-	
25	LPIUTE_HYP-ID	4	5	B	-	
29	ELEV	6	6	I	-	Elevation, in meters
35	SFTYPE	1	1	I	-	Surface feature type

Transformation error for lp_hyp

Scale (X,Y) = (203.365,203.015) Translation = (5962.861,-111.397)
Rotation (degrees) = (89.453) RMS Error (input,output) = (0.009,1.740)

ic id	input x output x	input y output y	x error	y error

	output x	output y	x error	y error
1	5.137	7.736		
	4399.978	946.962	-0.374	0.424
2	5.407	37.241		
	-1598.944	1062.298	-0.769	0.973
3	30.026	37.004		
	-1502.774	6061.464	-1.073	-0.787
4	29.767	7.500		
	4496.145	5945.997	-0.627	1.019
5	29.904	22.242		
	1496.705	6003.730	1.165	1.688
6	15.247	37.142		
	-1560.489	3061.965	-0.135	-1.138
7	15.113	22.378		
	1438.991	3004.270	2.452	-1.276
8	14.974	7.644		
	4438.432	2946.576	-0.980	-2.396
9	5.276	22.484		
	1400.537	1004.629	0.341	1.492

III) lp_hyd

The hydrography layer was traced in ink onto mylar from the 1:8,000 large-scale mylar base map, then scanned and transformed. User-defined items ELEV and SFTYPE were added to the database for the purpose of including the streams as features in a surface model. All ELEV entries are -9999 (nodata, the value for z-less breaklines) and SFTYPE has entries of 3 and 5, for hard breaklines and hardreplace, respectively. The database entries have no significance other than their usage in creating a surface model.

The AAT is defined as follows:

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	
1	FNODE#	4	5	B	-	
5	TNODE#	4	5	B	-	
9	LPOLY#	4	5	B	-	
13	RPOLY#	4	5	B	-	
17	LENGTH	4	12	F	3	
21	LPHD_POL#	4	5	B	-	
25	LPHD_POL-ID	4	5	B	-	
29	ELEV	6	6	I	-	Elevation, null values
35	SFTYPE	1	1	I	-	Surface feature type

transformation error for lp_hyd

Scale (X,Y) = (203.372,203.085) Translation = (-2063.249,6963.798)
Rotation (degrees) = (90.163) RMS Error (input,output) = (0.007,1.522)

ic id	input x / output x	input y / output y	x error	y error
1	29.524	31.867		
	4399.978	946.962	0.381	-0.110
2	29.052	2.362		
	-1598.944	1062.298	-0.740	-0.014
3	4.437	2.766		
	-1502.774	6061.464	-0.532	-0.588
4	4.905	32.259		
	4496.145	5945.997	-1.728	0.449
5	4.670	17.531		
	1496.705	6003.730	2.600	0.067
6	19.203	2.520		
	-1560.489	3061.965	-1.471	0.384
7	19.439	17.286		

	1438.991	3004.270	2.023	0.353
8	19.680	32.019		
	4438.432	2946.576	-1.403	-0.557
9	29.288	17.120		
	1400.537	1004.629	0.870	0.016

Triangular Irregular Network (TIN)

lp_tin

The tin for the Little Piute Mountains was constructed with data from the hypsography coverage. Since the density of information in the hypsography coverage varies, the information (ie: contour lines) was separated into two coverages, roughly according to the break in slope at the base of the mountains. The arcs in each coverage were densified, and the more sparsely spaced contour lines sampled every 350 meters, while the densely space contour lines were sampled every 25 meters. The boundary between the two contrasting areas cause artifacts, known as sliver polygons. The surface model is less accurate in those areas.

Spatial Resolution

Uses of this digital geologic map should not violate the spatial resolution of the data. Although the digital form of the data removes the constraint imposed by the scale of a paper map, the detail and accuracy inherent in map scale are also present in the digital data. The fact that the geologic database was edited at a scale of 1:8,000 means that higher resolution information is not present in the dataset. Plotting at scales larger than 1:8,000 will not yield greater real detail, although it may reveal fine-scale irregularities below the intended resolution of the database. Similarly, where this database is used in combination with other data of higher resolution, the resolution of the combined output will be limited by the lower resolution of these data. Note that in contrast to the geologic coverages, the base map layers have a resolution of 1:24,000, so significant discrepancies with the geologic coverages are possible. The base map layers are provided for reference only.

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