Description of Digital Files for *Preliminary surficial geologic map of the Mesquite Lake 30'X60' quadrangle, California and Nevada*

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Introduction

The U. S. Geological Survey Open-File Report 2006-1035 is a digital geologic data set that maps and describes the Quaternary geology of the Mesquite Lake 30' x 60' quadrangle, southern California and Nevada. These maps and databases are, part of the nation-wide digital geologic map coverage being developed by the National Cooperative Geologic Map Program of the U.S. Geological Survey (USGS). This document describes the types and contents of files comprising the database. Information on how to extract and plot the map also is provided.

Digital Open-File Contents

This Open-File Report consists of three digital packages. The first is the **Documentation Package**, which consists of this file in text and Adobe Portable Document Format (PDF), a Portable Document Format (PDF) file of the pamphlet (which includes a more detailed description of map units), FGDC metadata for the Report in text and html formats, and possibly a revision list. The second is **Digital Database Package**, which contains the geologic map database itself and associated metadata. For those interested in the geology of the map area that use an ARC/INFO-compatible (Environmental Systems Research Institute, www.esri.com) Geographic Information System (GIS), we have provided the map as an export file (.e00), the coverage, and the associated style file. The third package is the **Plot file Package**, which contains an on-screen viewable or printable image of the geologic map created from the database in Adobe Acrobat PDF (http://www.adobe.com/) format (see **Plot file Package** sections below). Although the plot file represents much of the information in the database, cartographic representation is complicated by the use of long map unit labels and narrow aspect ratio polygons. Those who have computer capability can access the plot file packages in any of the three ways described below (see the section **Obtaining the Digital Database and Plot file Packages**). However, the plot file packages do require zip utilities to access the plot files. Therefore, additional software, available free on the Internet, may be required to use the plot files (see **Zip files** section).

Those without computer capability can obtain plots of the map files through USGS plot-on-demand service for digital geologic maps (see section **Obtaining plots from USGS Open-File Services**) or from an outside vendor (see section **Obtaining plots from an outside vendor**).

Note: filenames used in this report are based on combinations of the Open-File Report number, followed by an underscore, followed by the number of the package, followed by an alphabetic character denoting the part of that package, followed by a ".", and a three or four digit file extension. For example, for a text file of the metadata part of the documentation package (package number 1) in Open-File Report OF99_999 (a fictitious report number) a file would be named of099_999_1a.txt

Documentation Package

The Documentation Package includes descriptions of this report, including instructions on how to get the report, data formats and content. It consists of 3 parts, a "Read Me" text description (this

file), FGDC compliant metadata describing the report, and a revision list, if any, that lists any revisions made to this report. This documentation package contains the following:

ReadMe_of06_1035.txt	a text file of the report text (this file)
ReadMe_of06_1035.pdf	a PDF file of the report text (this file)
of06_1035_pamphlet.pdf	a PDF file of the pamphlet to accompany the map including geologic interpretation, figures, and a description of map units
of06_1035_1a.txt	a text file of FGDC compliant metadata for this report
of06_1035_1a.html	an HTML file of FGDC compliant metadata for this report

Digital Database Package

The database package includes geologic map database files for the map area. The digital maps, or coverages, along with their associated database directory have been converted to uncompressed ARC/INFO export files (.e00) for distribution. ARC export files promote ease of data handling, and are usable by some Geographic Information Systems in addition to ARC/INFO. Additionally, ARC export files contain both the spatial and associated database information, so that it is possible to read and interpret the files and write simple code to convert the files to a format more convenient to the user, should no such code be available off-the-shelf. The ARC export files and associated ARC/INFO coverages, shapefiles, and style file included in the database are described below:

ARC/INFO export file	Resultant Coverage	Description of Coverage
of06_1035_2a.e00	ml-geo	Quaternary geologic units, faults, depositional and erosional contacts, and rock units in the quadrangle

style file	Description of style file
of06_1035_2b.style	Colors and patterns for LTYPES and PTYPES in ml-geo coverage

shapefile	Description of Shapefiles
of06_1035_2c.shp	Polygons of Quaternary geologic units and rock units in the quadrangle
of06_1035_2d.shp	Arcs of contacts for Quaternary geologic units and rock units in the quadrangle, faults, lineaments, and folds

The database package also includes the following file:

of06_1035_1a.txt	A text file of FGDC compliant metadata for this Report

Converting ARC export files

ARC export files are converted to ARC coverages using the ARC command IMPORT with the option COVER. To ease conversion and maintain naming conventions, we have included a style file (of06_1035_2b.style) with embedded color and line types. The style contains a set of color fills with associated attributes used to assign the fills and line types in ArcMap to polygon and

line features (arcs) by matching the attribute terminology. In ArcMap, styles are applied to features using the "Match to symbols in a style" choice under the "Categories" menu in Symbology tab.

ARC export files can also be read by some other Geographic Information Systems. Please consult your GIS documentation to see if you can use ARC export files and the procedure to import them. **Note**: consult the metadata or the **Database Specifics** section of this Report for details of the format and content of the digital database.

Plot file Package

For those interested in the geology of the map area that don't use an ARC/INFO compatible GIS system, we have included a separate data package of printable maps created from the database. Because this release is primarily a digital database, the plot files (and plots derived from) have not been edited to conform to U.S. Geological Survey cartographic standards. Small units have not been labeled with leaders and in some instances map features or annotations overlap. The map image is 33 by 63 inches and requires a large plotter to produce paper copies at the intended scale. The technical context of the map has undergone scientific review. The map images were created using a technique that composites the geologic map with the U.S. Geological Survey Digital Raster Graphic (DRG) for the map area, but the 'collar' information contained in the DRG was not presented on the geologic map.

The file of06_1035_3a.pdf is a PDF format file containing an image of the geologic map, at a scale of 1:100,000. The size of the map is 33 by 63 inches when printed at the map scale.

Zip files

The digital database packages described above are stored in a zip file. A zip, or winzip, compression utility is required to extract the database from the zip file. This utility operates under UNIX, Windows, and Macintosh operating systems, and can be obtained free of charge over the Internet from Internet Literacy's Common Internet File Formats Web page (http://www.matisse.net/files/formats.html). The zip algorithm may also be uncompressed with decompression programs, available free of charge over the Internet via links from the USGS Public Domain Software page (http://edc.usgs.gov/geodata/public.html).

Obtaining the Digital Database and Plot file Packages

The digital data can be obtained in two ways:

a. From the USGS Web Pages
b. Sending a CDR with request
c. Contacting USGS Open-File Services

To obtain zip files of database or plot file packages from the USGS web pages:
The U.S. Geological Survey web site is located at: http://www.usgs.gov/

The direct URL to the web page for this Report is:
http://pubs.usgs.gov/of/2006/1035

To obtain zip files of database or plot file packages on CDROM:
Database files, the PDF plot file, and related files can be obtained by sending a recordable compact disk (CDR) with request and return address to:

Mesquite Lake 30'x60', California Database
c/o Database Coordinator
U.S. Geological Survey
345 Middlefield Road, MS 973
Menlo Park, CA 94025

Do not omit any part of this address!

NOTE: Be sure to include with your request the exact names, as listed above, of the zip files you require. An Open-File Report number is not sufficient, unless you are requesting both the database package and plot file package for the report.

Obtaining plots from USGS Open-File Services
The U.S. Geological Survey will make plots on demand from map files such as those described in this report. The U.S. Geological Survey's Map on Demand website can be found at:
http://store.usgs.gov/mod/

Be sure to include with your request the publication number and the exact names, as listed above, of the plot file(s) you require. A publication number and its letter alone are not sufficient, unless you are requesting plots of all the plot files in this report. You may wish to determine the price before placing an order.

Also note that not all parts of this report (such as this text and the spatial data) are plot files, and may not be provided by the Map on Demand service.

Order plots from:
USGS Information Services
Box 25286
Denver Federal Center
Denver, CO 80225-0046
1-888-ASK-USGS
FAX: (303) 202-4693
e-mail: infoservices@usgs.gov

Obtaining plots from a commercial vendor
Many commercial vendors are capable of producing large format plots for a fee. Most commercial vendors will require the plot files to be on a CD-ROM or other portable disk format. Users may download the data from the Internet and create their own CD-ROM, or we can provide one (See **To obtain zip files of database or plot file packages on CDROM**). Make sure your vendor is capable of reading compact disks and PDF plot file, and be certain to provide a copy of this document to your vendor.

Digital Compilation
The map represents new digital mapping and is a not compiled from traditional analog sources. Features were digitized 'heads up' on various remote sensing datasets at varying scales. See file of06_1035_pamphlet.pdf for additional details of map generation.

The following quality control measures were taken: Geologic lines attributed as a 'contact' were checked so as to not separate geologic map units of the same type. No lines attributed as contacts are 'dangles'. All geologic polygons are attributed with map unit designators described in this report.

Base Maps

The base map presented on the geologic map images in this report is the Mesquite Lake 1:100,000 scale U.S. Geological Survey Digital Raster Graphic (DRG) for the map area. DRGs are available from the U.S. Geological Survey, as well as other data providers, and are not distributed with this report. The base map used in the original report may not be the same as that presented in this version.

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 this database was edited at a scale of 1:100,000 means that higher resolution information is not present 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, 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.

Database Specifics

Digital database format
The database in this report was compiled in ARC/INFO, a commercial Geographic Information System (Environmental Systems Research Institute, Redlands, California). All GIS work was done in ARC/INFO version 8.2 using ArcMap. The files are in ARC/INFO coverage format, and thus contain vector data. Coverages are distributed in uncompressed ARC export format. ARC/INFO export files (files with the .e00 extension) can be converted into ARC/INFO coverages in ArcGIS (see the **Digital Database Package**) and can be read by some other Geographic Information Systems, such as MapInfo via ArcLink and ESRI's ArcView (version 1.0 for Windows 3.1 to 3.11 is available for free from ESRI's web site: http://www.esri.com).

The map databases consist of ARC coverages and supporting INFO files, which are stored in a UTM (Universal Transverse Mercator) projection (Table 1).

Table 1 - *Map Projection*
The maps are stored in UTM projection

PROJECTION UTM	
UNITS METERS	-on the ground
ZONE 11	-UTM zone
DATUM NAD83	

The content of the geologic database can be described in terms of the lines, points, and the areas that compose the map. Descriptions of the database fields use the terms explained in Table 2.

Table 2 - *Field Definition Terms*

ITEM NAME	name of the database field (item)
WIDTH	maximum number of digits or characters stored
OUTPUT	output width
TYPE	B-binary integer, F-binary floating point number, I-ASCII integer, C-ASCII character string
N. DEC.	number of decimal places maintained for floating point numbers

Lines

The lines (arcs) are recorded as strings of vectors and are described in the arc attribute table (AAT) described in Table 3. They define the boundaries of the map units, faults, and the map boundaries. These distinctions, including the geologic identities of the unit boundaries, are recorded in the LTYPE field according to the line types listed in Table 4.

Table 3 – *Structure of the Arc Attribute Tables*

ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC	Description
FNODE#	4	5	B		starting node of arc (from node)
TNODE#	4	5	B		ending node of arc (to node)
LPOLY#	4	5	B		polygon ID to the left of the arc
RPOLY#	4	5	B		polygon ID to the right of the arc
LENGTH	4	12	F	3	length of arc in meters
<coverage>#	4	5	B		unique internal control number
<coverage>-ID	4	5	B		unique identification number
LTYPE	35	35	C		geologic line type (see Table 4)

Table 4 - *Line Types Recorded in the LTYPE Field of Arc Attribute Tables (listed by coverage name in alphabetical order).*
ml-geo

LTYPE	Count
anticline, approximately located	7
anticline, inferred	9
anticline, inferred, plunge	1
contact, approximately located	14870
contact, certain	188
contact, gradational	528
fault, approximately located	70
fault, certain	15
fault, concealed	130
fault, queried	101
lineament, approximately located	3

Areas

Map units (polygons) are described in the polygon attribute table (PAT) described in Table 5. The identities of the map units from the original map are recorded in the PTYPE field by map label, listed in Table 6. Note that ARC/INFO coverages cannot contain both point and polygon information, so only coverages with polygon information will have a polygon attribute table, and these coverages will not have a point attribute table. A complete Description of Map Units is available in the original report, or the digital version of the original report (of06_1035_pamphlet.pdf).

Classification of the Quaternary geologic units presented here is defined such that the first two characters in a label designate the relative age followed by a geomorphic process label and a subsequent modifier. The first letter is the period (Quaternary), the second letter is the relative age, the third letter is an abbreviation for the process type, and the fourth letter is reserved for an additional modifier of the process, age, or material. The relative ages of the units are sequentially presented beginning with the youngest surface or deposit. For example, a Qax surface is "active", Qyx is "young", Qix is “intermediate”, and Qox is “old”; where x is a placeholder for numerous deposits such as a (alluvium), e (eolian), or p (playa). Unless observed in the field and specifically mapped, it is possible that a given age geologic unit may be composed of a variety of subunits. For instance, alluvial units may have significant contributions from eolian or mass wasting deposits. Hence subunits such as mass wasting deposits are more common than represented on the map but could not be reliably deciphered from remote sensing techniques.

Active surfaces have received deposition within the last few decades (Qax) or centuries. They are characterized by loose sediment and are prone to flooding and sediment transport. They are typically unvegetated or moderately vegetated and have rough microtopography such as strongly developed bar and swale or debris-flow morphology such as lobes and levees. Active surfaces are small in area on alluvial fans and form discrete channels. Young surfaces (Qyx) are middle and early Holocene in age but are abandoned or receive sediment infrequently. They are characterized by loose to slightly compact sediments. Soil is thin and weakly developed and typically expressed as an incipient to weak, sandy vesicular horizon (A_v), weak cambic horizons (B_w), and Stage I calcic horizons (B_k to B_{km}). Young surfaces are moderately vegetated, especially with shrubs, and have fairly smooth microtopography, with moderate to faint remnants of bar and swale topography. Although no desert pavement or incipient pavement is generally present, the surface clasts have incipient varnish. Intermediate surfaces (Qix) are Late and Middle Pleistocene in age and have been abandoned for tens to hundreds of thousands of years. Sediments can be loose but are commonly compact. On these intermediate surfaces, desert pavement is moderately to well-developed with moderate to strong varnish on surface clasts of alluvium, except at high altitude. Microtopography of the surface is flat, lacking the original depositional morphology, but may exhibit weak to moderate incision locally. Pedogenic soil is moderately towell-developed with a silty A_v horizon, moderately to strongly developed B_t horizon and Stage I+ to III+ calcic horizon. Time-dependent processes such as pedogenesis, varnish development, and the vertical separation between units were best judged from field relations.

Composite symbols

Surficial geologic units commonly exist as thin (<2 m) veneers over older units including bedrock. In areas where this relationship is common, the unit designators are shown on the map separated by a slash (/). The younger, or overlying, unit is indicated first. Thus, Qya/Qoa

indicates an area where a veneer of young alluvial fan deposits overlies old alluvial fan deposits and Qya/fpg indicates an area where a veneer of young alluvial fan deposits overlies felsic plutonic rock that weathered to grus.

The lateral extent of individual deposits is commonly so small that each deposit cannot be shown individually at the database map scale. Areas made up of deposits too small to show individually, are indicated by deposits (representing more than 20% of the area) separated by a plus sign (+), with the most common deposit listed first. Thus, Qya + Qia indicates an area with both Qya and Qia deposits and associated surfaces, and that Qya is more common than Qia; other deposits in the area compose less than 20%. Where a slash separates mixed units, the assemblage of mixed units combined by (+) sign are treated as a unit. For instance the unit Qaae/Qaa+Qya indicates that Qaae overlies the mixed unit Qaa+Qya. Similarly, Qia+Qya/Qoa indicates that the mixed unit Qia+Qya overlies Qoa.

Table 5 - *Structure of the Polygon Attribute Tables*

ITEM NAME	WIDTH		OUTPUT		TYPE	N.DEC	Description
AREA	4	12	F	3			area of polygon in map units (meters)
PERIMETER (meters)	4	12	F	3			length of perimeter in map units
<coverage>#	4	5	B				unique internal control number
<coverage>-ID	4	5	B				unique identification number
PTYPE	35	35	C				map unit label

Table 6 - *Map Units Recorded in the PTYPE field of Polygon Attribute Tables (listed by coverage name in alphabetical order). Descriptions pertain only to primary unit in composite units. See Description of Map Units within of06_1035_pamphlet.pdf file for complete unit descriptions.*

ml-geo

PTYPE	Count	Description
ml	11	Made land or artificial fill (latest Holocene)
ml/Qia	1	Made land or artificial fill (latest Holocene)
ml/Qya	1	Made land or artificial fill (latest Holocene)
Qaa	30	Active alluvial fan deposit (latest Holocene)
Qaa/Qipw	1	Active alluvial fan deposit (latest Holocene)
Qaa+Qia	2	Active alluvial fan deposit (latest Holocene)
Qaa+Qya	35	Active alluvial fan deposit (latest Holocene)
Qaa+Qyad	2	Active alluvial fan deposit (latest Holocene)
Qaa+Qyed/Qipw	1	Active alluvial fan deposit (latest Holocene)
Qaae/Qya	1	Active mixed alluvial and eolian sand deposit (latest Holocene)
Qaae/Qyed	1	Active mixed alluvial and eolian sand deposit (latest Holocene)
Qaag+Qyag	3	Active alluvial fan deposit composed of grus (latest Holocene)
Qae	2	Active eolian sand deposit (latest Holocene)
Qae/ca	1	Active eolian sand deposit (latest Holocene)
Qae/Qya	1	Active eolian sand deposit (latest Holocene)
Qae+Qyed	1	Active eolian sand deposit (latest Holocene)
Qaed	2	Active eolian sand dune deposit (latest Holocene)

Qaer	3	Active eolian sand ramp deposit (latest Holocene)
Qaer/mv	1	Active eolian sand ramp deposit (latest Holocene)
Qags	1	Active groundwater discharge deposit (latest Holocene)
Qags+Qig	1	Active groundwater discharge deposit (latest Holocene)
Qap	5	Active playa deposit (latest Holocene)
Qapf	5	Active playa fringe deposit (latest Holocene)
Qapf+Qypf	1	Active playa fringe deposit (latest Holocene)
Qaps	1	Active playa sandy facies deposit (latest Holocene)
Qapw	2	Active wet playa deposit (latest Holocene)
Qav	1	Active valley-axis deposit (latest Holocene)
Qav+Qye	1	Active valley-axis deposit (latest Holocene)
Qav+Qyv	3	Active valley-axis deposit (latest Holocene)
Qaw	13	Active wash deposit (latest Holocene)
Qaw+Qya	26	Active wash deposit (latest Holocene)
Qaw+Qydf	1	Active wash deposit (latest Holocene)
Qawg+Qyag	1	Active wash deposit dominantly composed of grus (latest Holocene)
Qha/ca	201	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/ca+sl	6	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/fp	7	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/fp+mr	1	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/fpg	7	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/fpg+mp	1	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/fpg+mr	5	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/fv	8	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/mp	39	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/mp+fpg	1	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/mr	40	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/mr+fpg	2	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/mv	92	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/pc	121	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/sl	95	Abundant hillslope deposits (Holocene and Pleistocene)
Qha/sl+ca	8	Abundant hillslope deposits (Holocene and Pleistocene)
Qhs/ca	2	Sparse hillslope deposits (Holocene and Pleistocene)
Qhs/ca+sl	2	Sparse hillslope deposits (Holocene and Pleistocene)
Qhs/fpg	10	Sparse hillslope deposits (Holocene and Pleistocene)
Qhs/mr+fpg	1	Sparse hillslope deposits (Holocene and Pleistocene)
Qhs/mv	1	Sparse hillslope deposits (Holocene and Pleistocene)
Qhs/pc	2	Sparse hillslope deposits (Holocene and Pleistocene)
Qhs/sl	1	Sparse hillslope deposits (Holocene and Pleistocene)
Qia	815	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/ca	12	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/ca+sl	6	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/fp	2	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/fv	2	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/mv	10	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/pc	7	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/Qig	1	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia/Qoa	8	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qaa	2	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qoa	17	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qoa/ca+sl	2	Intermediate alluvial fan deposit (late and middle Pleistocene)

Qia+Qya	182	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qya/ca+sl	1	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qyag	9	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qyao	3	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qia+Qyaog	1	Intermediate alluvial fan deposit (late and middle Pleistocene)
Qiad	10	Intermediate alluvial fan composed of debris-flow deposits (late and middle Pleistocene)
Qiad+Qia	4	Intermediate alluvial fan composed of debris-flow deposits (late and middle Pleistocene)
Qiad+Qyad	2	Intermediate alluvial fan composed of debris-flow deposits (late and middle Pleistocene)
Qiae	9	Intermediate mixed alluvial and eolian sand deposit (late and middle Pleistocene)
Qiae/Qig	10	Intermediate mixed alluvial and eolian sand deposit (late and middle Pleistocene)
Qiae+Qyae	1	Intermediate mixed alluvial and eolian sand deposit (late and middle Pleistocene)
Qiag	47	Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)
Qiag/fp	4	Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)
Qiag/fpg	2	Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)
Qiag+Qae	2	Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)
Qiag+Qyad	1	Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)
Qiag+Qyag	34	Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)
Qie	15	Intermediate eolian sand deposit (late and middle Pleistocene)
Qie/pc	2	Intermediate eolian sand deposit (late and middle Pleistocene)
Qie/Qoa	2	Intermediate eolian sand deposit (late and middle Pleistocene)
Qie/Qoe	7	Intermediate eolian sand deposit (late and middle Pleistocene)
Qig	25	Intermediate groundwater discharge deposit (late and middle Pleistocene)
Qig+Qye	1	Intermediate groundwater discharge deposit (late and middle Pleistocene)
Qimc	37	Intermediate colluvial deposits (late and middle Pleistocene)
Qimc/mr	1	Intermediate colluvial deposits (late and middle Pleistocene)
Qimc/mv	25	Intermediate colluvial deposits (late and middle Pleistocene)
Qimc/pc	8	Intermediate colluvial deposits (late and middle Pleistocene)
Qimc+Qye	2	Intermediate colluvial deposits (late and middle Pleistocene)
Qimc+Qymc	1	Intermediate colluvial deposits (late and middle Pleistocene)
Qipc	1	Intermediate crystal body playa deposit (late and middle Pleistocene)
Qipw	4	Intermediate wet playa deposit (late and middle Pleistocene)
Qiv	2	Intermediate valley-axis deposit (late and middle Pleistocene)
Qoa	748	Older valley-axis deposits (early Pleistocene)
Qoa/ca	7	Old alluvial fan deposit (middle and early Pleistocene)
Qoa/ca+sl	4	Old alluvial fan deposit (middle and early Pleistocene)
Qoa/mv	1	Old alluvial fan deposit (middle and early Pleistocene)
Qoa/pc	8	Old alluvial fan deposit (middle and early Pleistocene)

Qoa/sl	1	Old alluvial fan deposit (middle and early Pleistocene)
Qoa+Qia	17	Old alluvial fan deposit (middle and early Pleistocene)
Qoa+Qia/ca+sl	3	Old alluvial fan deposit (middle and early Pleistocene)
Qoa+Qia/sl	2	Old alluvial fan deposit (middle and early Pleistocene)
Qoa+Qiad	1	Old alluvial fan deposit (middle and early Pleistocene)
Qoad	4	Old alluvial fan composed of debris-flow deposits (middle and early Pleistocene)
Qoae	2	Old mixed alluvial and eolian sand deposit (middle and early Pleistocene)
Qoag	8	Old alluvial fan deposit composed of grus (middle and early Pleistocene)
Qoag/fp	1	Old alluvial fan deposit composed of grus (middle and early Pleistocene)
Qoag/fpg	1	Old alluvial fan deposit composed of grus (middle and early Pleistocene)
Qoe	6	Old eolian sand deposit (middle and early Pleistocene)
Qog/ca+sl	1	Old groundwater discharge deposit (middle and early Pleistocene)
Qog/sl	1	Old groundwater discharge deposit (middle and early Pleistocene)
Qomc	15	Older colluvial deposits (middle and early Pleistocene)
Qomc+Qye	1	Older colluvial deposits (middle and early Pleistocene)
Qov	5	Older valley-axis deposits (early Pleistocene)
Qpd-ca	1	Deeply dissected pediment
Qpi-fp	3	Incised pediment
Qpi-fpg	2	Incised pediment
Qpi-mr	2	Incised pediment
QToa	59	Oldest Quaternary-Tertiary alluvial fan deposit (early Pleistocene and Pliocene)
QToa/fp+mr	1	Oldest Quaternary-Tertiary alluvial fan deposit (early Pleistocene and Pliocene)
QToa/mv	10	Oldest Quaternary-Tertiary alluvial fan deposit (early Pleistocene and Pliocene)
Qya	356	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/ca	4	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/pc	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/Qia	16	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/Qig	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/Qil	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/Qipw	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya/Qov	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qaa	111	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qaa/Qpi-sl	2	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qaae	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qaw	39	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qia	151	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qia/ca+sl	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qoa	1	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qyad	2	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qya+Qyao	15	Young alluvial fan deposit (Holocene and latest Pleistocene)
Qyad/Qia	1	Young alluvial fan composed of debris-flow deposits (Holocene and latest Pleistocene)

Qyad+Qaw	1	Young alluvial fan composed of debris-flow deposits (Holocene and latest Pleistocene)
Qyae	8	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae/Qia	1	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae/Qig	4	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae/Qipw	1	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae/Qiv	1	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae/Qya+Qaa	4	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae+Qia	7	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae+Qiae	1	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyae+Qya	1	Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)
Qyag	36	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag/fp	1	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag/Qia	14	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qaag	29	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qaw	1	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qawg	1	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qia	2	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qiag	28	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qyad	1	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qyae	3	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qyaog	11	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyag+Qypf	1	Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)
Qyao+Qya	4	Older young alluvial fan (early Holocene and latest Pleistocene)
Qyaog+Qyae	1	Older young alluvial fan composed of grus (early Holocene and latest Pleistocene)
Qyaog+Qyag	4	Older young alluvial fan composed of grus (early Holocene and latest Pleistocene)
Qye	10	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/pc	1	Young eolian sand deposit (Holocene and latest Pleistocene)

Qye/Qia	17	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qiag	2	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qie	2	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qie/pc	2	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qig	1	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qiv	6	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qoa	6	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qoe	1	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qya	3	Young eolian sand deposit (Holocene and latest Pleistocene)
Qye/Qyag	1	Young eolian sand deposit (Holocene and latest Pleistocene)
Qyea	7	Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)
Qyea/Qia	2	Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)
Qyea/Qoa	25	Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)
Qyea/Qya	1	Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)
Qyea+Qipw	1	Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)
Qyea+Qya	5	Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)
Qyed	8	Young eolian sand dune deposit (Holocene and latest Pleistocene)
Qyed/Qia	3	Young eolian sand dune deposit (Holocene and latest Pleistocene)
Qyed/Qig	8	Young eolian sand dune deposit (Holocene and latest Pleistocene)
Qyed/Qipw	1	Young eolian sand dune deposit (Holocene and latest Pleistocene)
Qyed+Qipw	1	Young eolian sand dune deposit (Holocene and latest Pleistocene)
Qygs	5	Young groundwater discharge deposit (Holocene and latest Pleistocene)
Qymc	2	Young colluvial deposits (Holocene and latest Pleistocene)
Qypf	2	Young playa fringe deposit (Holocene and latest Pleistocene)
Qypf/Qipw	1	Young playa fringe deposit (Holocene and latest Pleistocene)
Qypf+Qapf	1	Young playa fringe deposit (Holocene and latest Pleistocene)
Qypw	1	Young wet playa deposit (Holocene and latest Pleistocene)
Qyv	3	Young valley-axis deposit (Holocene and latest Pleistocene)
Qyv/Qiag	1	Young valley-axis deposit (Holocene and latest Pleistocene)
Qyv+Qav	1	Young valley-axis deposit (Holocene and latest Pleistocene)
Qyv+Qiv	8	Young valley-axis deposit (Holocene and latest Pleistocene)