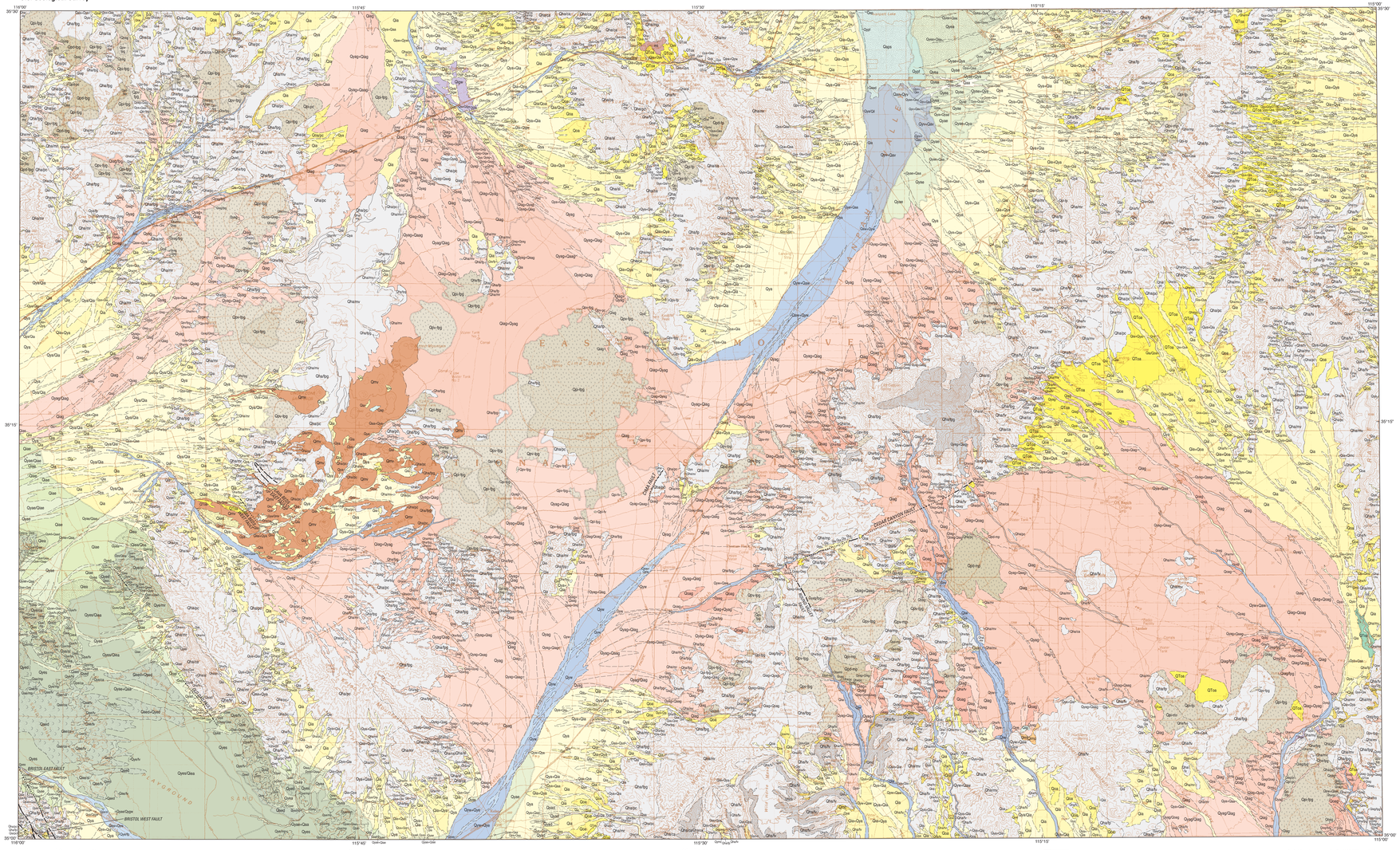
U.S. Department of the Interior
U.S. Geological Survey

Scientific Investigations Map 3206
Pamphlet accompanies map



Modified base from U.S. Geological Survey, 1985
Universal Transverse Mercator projection, zone 11
1983 North American Datum

APPROXIMATE MEAN DECLINATION, 2012

SCALE 1:100 000

CONTOUR INTERVAL 50 METERS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MAP LOCATION

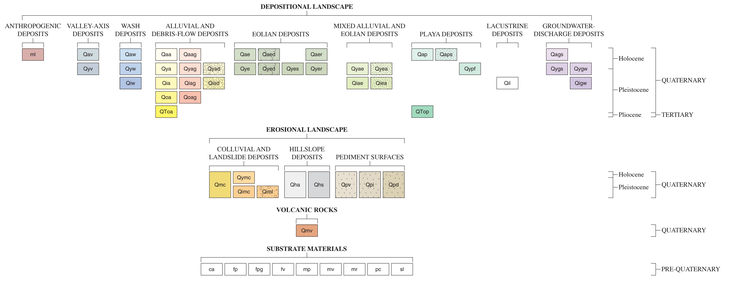
Surficial geology mapped by David M. Miller and others (1988–2008)
GIS database and digital cartography by David M. Miller and Shannon R. Leslie
Edited by J.L. Zigler
Digital cartographic production by Darlene A. Ryan
Manuscript approved for publication March 28, 2012

Surficial Geologic Map of the Ivanpah 30′ x 60′ Quadrangle, San Bernardino County, California, and Clark County, Nevada

By
David M. Miller
2012

CORRELATION OF MAP UNITS

[See Description of Map Units (in pamphlet) for precise unit ages]



LIST OF MAP UNITS

[Explanation of Composite Symbols: Surficial geologic units that form thin veneers over other units are shown with the younger, or overlying, unit indicated first, followed by a slash, and the older, underlying unit. Thus, **Qya/Qoa** indicates a veneer of unit **Qya** overlying unit **Qoa**. Where the lateral extent of deposits is too small to show individually at the map scale, they are grouped as two units 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 **Qya** is more common than **Qia**. Pediments are erosional surfaces that are represented by two terms separated by a hyphen (-). The first term indicates the degree to which the pediment is dissected and the second term indicates substrate materials. Thus, **Qpv-fpg** indicates a veneered pediment (**Qpv**) cut into grus-forming felsic plutonic rock (**fpg**). Unit boxes shown without color represent bedrock underlying surficial deposits shown on map. See Description of Map Units (in pamphlet) for complete unit descriptions]

DEPOSITIONAL LANDSCAPE

ANTHROPOGENIC DEPOSITS

- mf — **Made land or artificial fill (latest Holocene)**

VALLEY-AXIS DEPOSITS

- Qav — **Active valley-axis deposit (latest Holocene)**
- Qyv — **Young valley-axis deposit (Holocene and latest Pleistocene)**

WASH DEPOSITS

- Qaw — **Active wash deposit (latest Holocene)**
- Qyw — **Young wash deposit (Holocene and latest Pleistocene)**
- Qiw — **Intermediate wash deposit (late to middle Pleistocene)**

ALLUVIAL AND DEBRIS-FLOW DEPOSITS

- Qaa — **Active alluvial fan deposit (latest Holocene)**
- Qaag — **Active alluvial fan deposit composed of grus (latest Holocene)**
- Qya — **Young alluvial fan deposit (Holocene and latest Pleistocene)**
- Qyag — **Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)**
- Qyad — **Young alluvial fan deposit composed of debris-flow deposits (Holocene and latest Pleistocene)**
- Qia — **Intermediate alluvial fan deposit (late to middle Pleistocene)**
- Qiag — **Intermediate alluvial fan deposit composed of grus (late to middle Pleistocene)**
- Qiad — **Intermediate alluvial fan deposit composed of debris-flow deposits (late to middle Pleistocene)**
- Qoa — **Old alluvial fan deposit (middle to early Pleistocene)**
- Qoag — **Old alluvial fan deposit composed of grus (middle to early Pleistocene)**
- QTOa — **Extremely old alluvial fan deposit (Pleistocene to Pliocene)**

EOLIAN DEPOSITS

- Qae — **Active eolian sand deposit (latest Holocene)**
- Qaed — **Active eolian sand dune deposit (latest Holocene)**
- Qaer — **Active eolian sand ramp deposit (latest Holocene)**
- Qye — **Young eolian sand deposit (Holocene and latest Pleistocene)**
- Qyed — **Young eolian sand dune deposit (Holocene and latest Pleistocene)**
- Qyes — **Young eolian sand sheet deposit (Holocene and latest Pleistocene)**
- Qyer — **Young eolian sand ramp deposit (Holocene and latest Pleistocene)**

MIXED ALLUVIAL AND EOLIAN DEPOSITS

- Qyae — **Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)**
- Qyea — **Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)**
- Qiae — **Intermediate mixed alluvial and eolian sand deposit (late to middle Pleistocene)**
- Qiea — **Intermediate mixed eolian sand and alluvial deposit (late to middle Pleistocene)**

PLAYA DEPOSITS

- Qap — **Active playa deposit (Holocene)**
- Qapk — **Active playa sandy facies deposit (Holocene)**
- Qypf — **Young playa fringe deposit (Holocene and latest Pleistocene)**
- QTop — **Extremely old playa deposit (early Pleistocene and Pliocene)**

LACUSTRINE DEPOSITS

- Qil — **Intermediate lacustrine deposit (late to middle Pleistocene)**—Underlies alluvial depsoits near edge of Ivanpah Lake

GROUNDWATER-DISCHARGE DEPOSITS

- Qagp — **Active groundwater-discharge spring mound deposit (Holocene)**
- Qygp — **Young groundwater-discharge spring mound deposit (Holocene and latest Pleistocene)**
- Qygw — **Young groundwater-discharge wetland deposit (Holocene and latest Pleistocene)**
- Qigw — **Intermediate groundwater-discharge wetland deposit (late to middle Pleistocene)**

EROSIONAL LANDSCAPE

COLLUVIAL AND LANDSLIDE DEPOSITS

- Qmc — **Mass-movement colluvial deposits, undivided (Holocene and Pleistocene)**
- Qymc — **Young mass-movement colluvial deposit (Holocene and Pleistocene)**
- Qimc — **Intermediate mass-movement colluvial deposit (Pleistocene)**
- Qimd — **Intermediate mass-movement landslide deposit (Pleistocene)**

HILLSLOPE DEPOSITS

- Qha — **Abundant hillslope deposits (Holocene and Pleistocene)**
- Qhs — **Sparse hillslope deposits (Holocene and Pleistocene)**

PEDIMENT SURFACES

- Qpv — **Veneered pediment**
- Qpi — **Incised pediment**
- Qpd — **Deeply dissected pediment**

VOLCANIC ROCKS

- Qmv — **Mafic volcanic rocks (Quaternary)**

SUBSTRATE MATERIALS

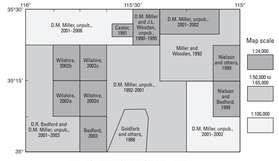
- ca — **Carbonate rocks**
- fp — **Felsic plutonic rocks**
- fpg — **Felsic plutonic rocks that weather to grus**
- fv — **Felsic volcanic rocks**
- mp — **Mafic plutonic rocks**
- mv — **Mafic volcanic rocks**
- mr — **Metamorphic rocks**
- pc — **Partly consolidated materials**
- sl — **Siliciclastic rocks**

SYMBOL EXPLANATION

Contact—Dashed where approximate

Gradational contact

Fault—Dashed where approximate; dotted where concealed. Queried where identity or existence questionable



Index to Sources of Surficial Geologic Mapping

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