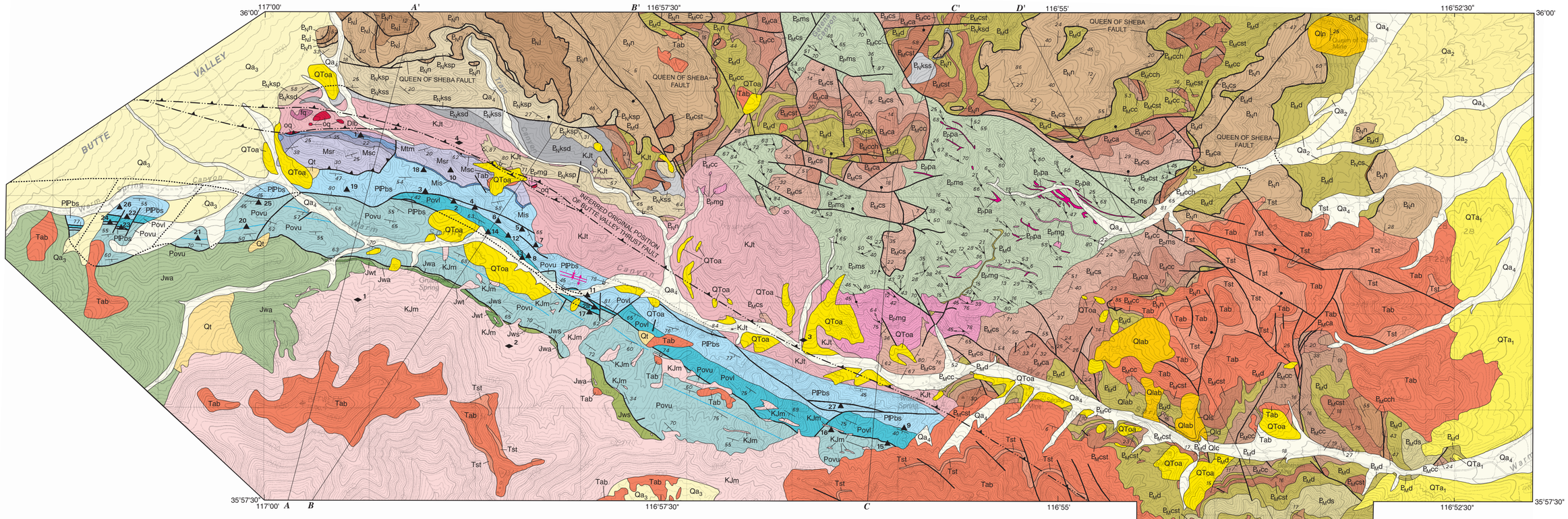
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

SCIENTIFIC INVESTIGATIONS MAP 2974
Pamphlet accompanies map



Base from U.S. Geological Survey 7.5-minute quadrangles:
Manly Peak, provisional edition, 1984
Anvil Spring Canyon West, provisional edition, 1985
Anvil Spring Canyon East, provisional edition, 1985

Lambert Conformal Conic projection

APPROXIMATE MEAN DECLINATION, 2007

SCALE 1:24 000

KILOMETERS

MILES

FEET

CONTOUR INTERVAL 10 METERS

AREA OF MAP

Geology mapped by C.T. Wrucke, 1951, 1958, 1961-63, with additions 1971-2005; P. Stone, 1979, 1982, with additions 2002-2005

Database and cartography by P. Stone

Edited by Taryn A. Lindquist

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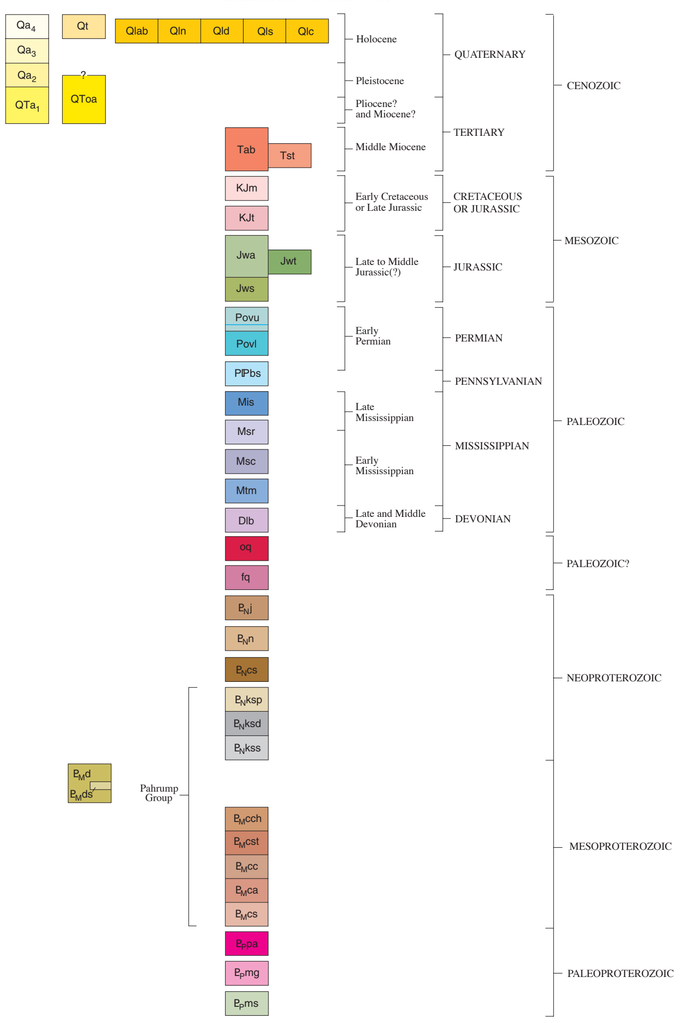
CORRELATION OF MAP UNITS



LIST OF MAP UNITS

[See Description of Map Units (in pamphlet) for complete unit descriptions]

Alluvial-fan and wash deposits (Holocene to Miocene?)

- Qa_4 — **Unit 4 (Holocene)**
- Qa_3 — **Unit 3 (Holocene)**
- Qa_2 — **Unit 2 (Pleistocene)**
- QTa_1 — **Unit 1 (Pleistocene to Miocene?)**
- Qt — **Talus (Holocene)**

Landslide deposits (Holocene)

- Qlab — **Deposits derived from the Miocene andesite and basalt [unit Tab]**
- Qln — **Deposits derived from the Neoproterozoic Noonday Dolomite [unit B_Nn]**
- Qld — **Deposits derived from the Mesoproterozoic diabase [unit B_Md]**
- Qls — **Deposits derived from the stromatolite member of the Mesoproterozoic Crystal Spring Formation [unit $B_M$cst]**
- Qlc — **Deposits derived from the cherty dolomite member of the Mesoproterozoic Crystal Spring Formation [unit $B_M$cc]**
- QToa — **Older alluvium (Pleistocene? to Miocene?)**

Volcanic rocks (middle Miocene)

- Tab — **Andesite and basalt**
- Tst — **Silicic tuff**
- KJm — **Monzogranite (Early Cretaceous or Late Jurassic)**
- KJt — **Tonalite (Early Cretaceous or Late Jurassic)**

Warm Spring Formation (Late to Middle Jurassic?)

- Jwa — **Andesite**
- Jwt — **Ash-flow tuff**
- Jws — **Sandstone**

Owens Valley Group (Early Permian)

- Povu — **Upper unit**—Showing bases of selected limestone zones
- Povl — **Lower unit**
- PIPbs — **Bird Spring Formation (Early Permian and Pennsylvanian)**
- Mis — **Indian Springs Formation (Late Mississippian)**
- Msr — **Santa Rosa Hills Limestone (Late and Early Mississippian)**
- Msc — **Stone Canyon Limestone (Early Mississippian)**
- Mtm — **Tin Mountain Limestone (Early Mississippian)**
- Dlb — **Lost Burro Formation (Late and Middle Devonian)**
- oq — **Orthoquartzite (Paleozoic?)**
- fq — **Fine-grained quartzite (Paleozoic?)**
- B_Nj — **Johnnie Formation (Neoproterozoic)**
- B_Nn — **Noonday Dolomite (Neoproterozoic)**
- $B_N$cs — **Conglomerate and sandstone (Neoproterozoic)**

Pahrump Group (Neoproterozoic and Mesoproterozoic)

Kingston Peak Formation (Neoproterozoic)

- $B_N$ksp — **South Park Member**

Surprise Member

- $B_N$ksd — **Diamictite**
- $B_N$kss — **Siltstone**

Crystal Spring Formation (Mesoproterozoic)

- $B_M$cch — **Chert member**
- $B_M$cst — **Stromatolite member**
- $B_M$cc — **Cherty dolomite member**
- $B_M$ca — **Argillite member**
- $B_M$cs — **Sandstone member**
- B_Md, $B_M$ds — **Diabase (Mesoproterozoic)**—Includes internal sill ($B_M$ds)
- $B_P$pa — **Pegmatite and aplite (Paleoproterozoic)**
- $B_P$mg — **Monzogranite gneiss (Paleoproterozoic)**
- $B_P$ms — **Mica schist (Paleoproterozoic)**

Contact—Solid where accurately located; dotted where concealed or (in cross section) projected above surface

Fault—Solid where accurately located; dotted where concealed or (in cross section) projected above surface. Bar and ball on downthrown side. Showing dip where known. Arrow shows direction of relative fault movement (in cross section)

Low-angle normal fault—Solid where accurately located; dotted where concealed. Hachures on hanging wall

Thrust fault—Sawteeth on upthrown side. Showing dip where known

Inferred pre-intrusion location of major thrust fault—Sawteeth on upthrown side. Arrow shows direction of relative fault movement (in cross section)

Folds—Showing trace of axial surface

Syncline

Anticline

Strike and dip of beds

Inclined

Overturned

Strike and dip of foliation

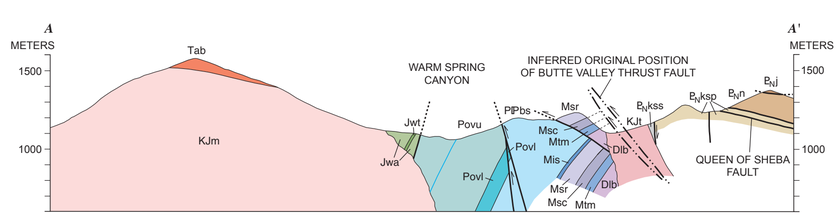
Inclined

Vertical

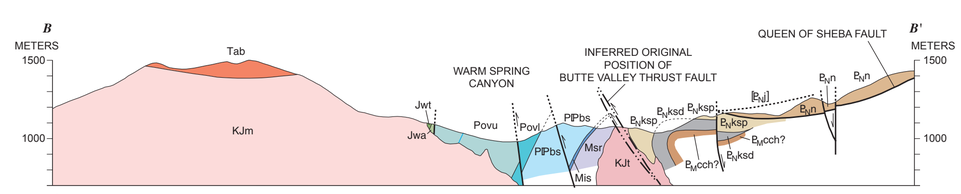
Bearing and plunge of lineation—May be combined with foliation

Fossil locality—See table 2 (in pamphlet) for fossil names and ages

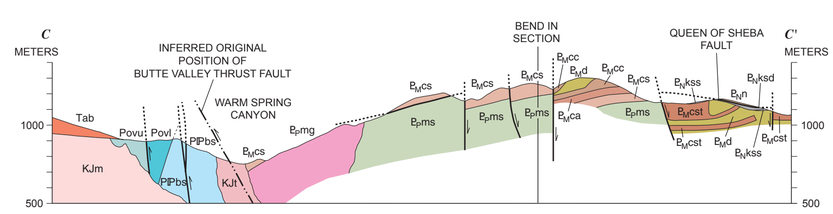
Potassium-argon (K-Ar) age locality—See table 3 (in pamphlet) for ages



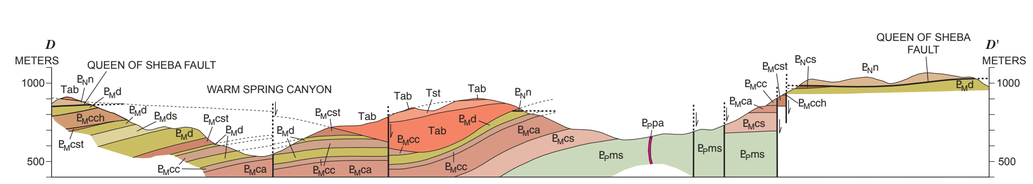
Quaternary units not shown; arrows show direction of relative fault movement



Quaternary units not shown; unit name in brackets indicates projected position above fault; arrows show direction of relative fault movement



Quaternary units not shown; arrows show direction of relative fault movement



Quaternary units not shown; arrows show direction of relative fault movement

GEOLOGIC MAP OF THE WARM SPRING CANYON AREA, DEATH VALLEY NATIONAL PARK, INYO COUNTY, CALIFORNIA

By
Chester T. Wrucke, Paul Stone, and Calvin H. Stevens

2007

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