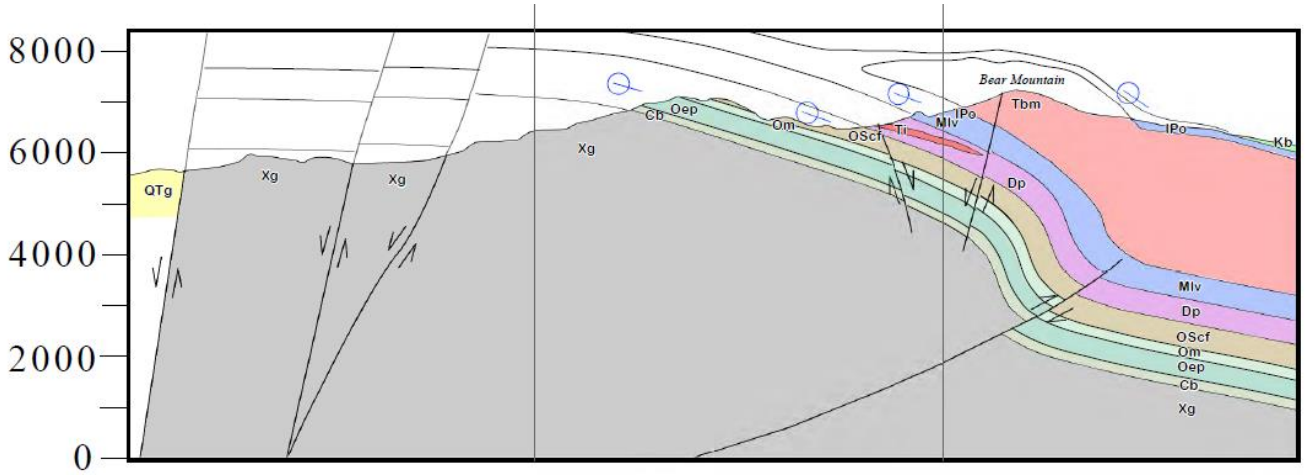
Grant County Rolling Stones Gem and Mineral Club - May 4, 2019
Geology Field Trip: Bear Mountain Road to LS Mesa



Introduction: The Silver City Range is a block of Proterozoic to Mesozoic age rocks (grey to green) which have been folded, faulted and intruded by igneous rock (red). A northeast trending fault separates the Silver City Range from LS Mesa. Ls Mesa is underlain by gravels and younger basalt flows.

Short history:
The 'basement' of the Silver City Range is metamorphic and granite rocks (grey, xg on map) formed about 1700 – 1400 million years ago. These rocks formed during the growth of the continent as subduction zones and other tectonic events added material to the southern margin of North America.

By 500 million years ago, the continent was stable and the seas rose and fell across the region multiple times. Limestone and some shale were deposited in these warm shallow seas. Life was happy on the sea floor and the rocks contain abundant invertebrate fossils. Some of the rocks deposited during this period were later removed by erosion.

Starting about 150 million years ago, the Sevier Mountains rose along the Nevada/Utah border as a result of a subduction zone of the west coast. Streams and rivers carried sediments east to the Cretaceous Interior Seaway. In the Silver City area the Beartooth Formation (Kb in grass green) was deposited as beach sands as the ocean rose across the landscape. The Colorado Shale (Kc in green) was deposited later as mud flooded into the sea.

Near 50 million years ago the rocks of the Silver City Range were uplifted, tilted and faulted when subduction on the west coast 'flattened'. This was followed by intense volcanic activity in most of southern New Mexico, which included the intrusion of the igneous rocks at Bear Mt. The final event in the area was faulting. The mountains of the Silver City Range and the Mogollons were uplifted along normal faults. The adjacent valleys filled with sediment from streams and alluvial fans flowing from the mountains. Eruptions of basalt lavas also occurred in some places.

Map and sections from: Copeland, P., M. A. Murphy, and W. R. Dupre, 2010, Geologic map and cross-sections of the Silver City Range, Grant County, New Mexico: New Mexico Bureau of Geology & Mineral Resources Open File Report 524. Available from www.geoinfo.nmt.edu

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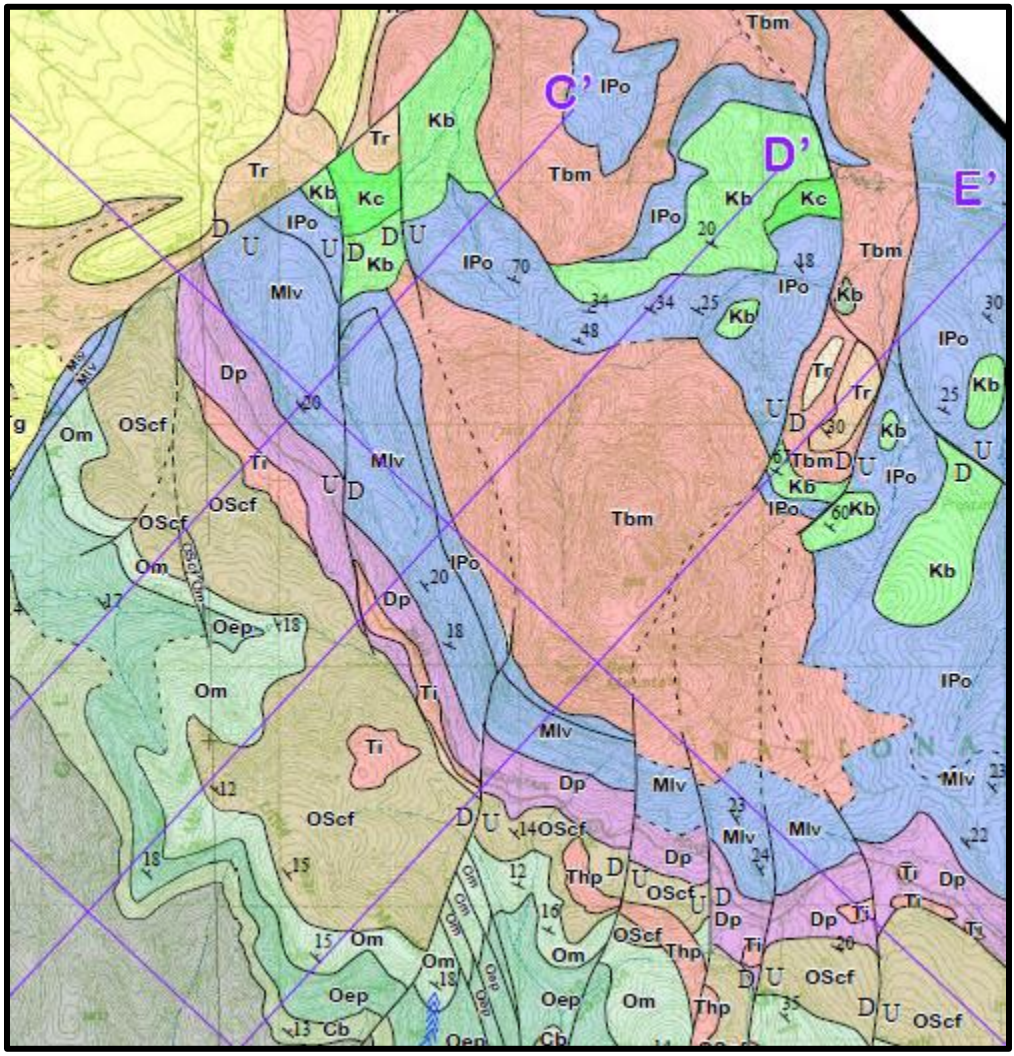
Possible Stops:



Stop 1: Lake Valley Limestone (Mlv) and Percha Shale (Dp)
Layers are tilted to the NE. Abundant fossils in both units.

Stop 2: Percha Shale (Dp)
The lower Percha Shale is black in color because it contains organic material.

Stop 3: Fault
Fault at the end of the Silver City Range. Limestone and shale on the south, gravels on the north side of the fault which forms a small valley here.

Stop 4: View back to Bear Mt
The Lake Valley Limestone forms a prominent outcrop. The valley is in the Percha Shale, a much softer, more easily eroded layer.

Stop 5: Cinder cone
There are two small cinder cones on LS Mesa. It is possible to hike around this cinder cone to a small pit on the NE side. The lava that holds up the top of LS Mesa may have come from these cinder cones.

Stop 6: Contact between lava and gravels
The lava flowed out over the top of the gravels and created a 'baked' contact where the gravels were heated and oxidized (so they are now red) by the hot lava.

Stop 7: Hike up Little Bear Mt
The road up Little Bear Mountain is on Silurian Fusselman Formation (OScf) and corals may be present. The resistant dolomites of the Montoya Formation (Om) are present in the crest. The expansive views to the west are highlighted by the red rocks of the Proterozoic granites at the base of the mountains.

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