Geologic map of Slate Range Crossing area, California, USA

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ABSTRACT

This detailed geologic map and supplemental digital data set examine and demonstrate the complex Neogene–Quaternary deformation in the Slate Range Crossing area (California, USA) of the active dextral transtension of the Death Valley region and Walker Lane belt. This map integrates the late Cenozoic structures and geologic units with the Mesozoic geologic units and deformation as a data set to examine the controls on reactivation of older structures. These geologic data were collected to study pre-, syn-, and post-kinematic rocks to examine the deformation history of the area and to find palinspastic markers to examine the late Cenozoic fault displacement and displacement history across Panamint Valley to the east, as reported in Andrew and Walker (2009).

The study focused on defining the Miocene and Pliocene rocks and deposits and examining lateral changes and depositional sources of clasts. There are two different volcanic-sedimentary sequences in this area. A Miocene section contains mafic to felsic volcanic units, numerous debris-flow to lahars, and several associated conglomerates and breccias containing exotic clasts. The exotic clasts are matched to rocks in the Panamint Range on the east side of Panamint Valley as reported in Andrew and Walker (2009) as displacement vectors for palinspastic reconstructions. These Miocene strata ubiquitously dip eastward 20–40º. A younger volcanic-sedimentary sequence contains relatively thin mafic lava flows and associated locally derived, coarse-grained mass wasting deposits. These younger basaltic lavas generally have gentle dipping lava flow features and foliation. Numerous faults cut the different age deposits allowing a chronology of Neogene to Quaternary faulting; additionally, there are numerous fabrics associated with Jurassic contraction and Cretaceous (?) dextral shear. The area near Slate Range Crossing has a conspicuous zone of earthquake foci; this study found that some of this seismic activity coincides with a zone of southwest-striking, moderately dipping to the north, sinistral-oblique normal faults, which cut across the northernmost Slate Range. These faults form a structural boundary between the Argus and Slate Ranges and link the fault networks in Panamint Valley with those in Searles Valley. This mapping and structural data demonstrate the two-stage Neogene fault history of the Walker Lane belt deformation in this area and show that regional tilting of rocks occurred after ca. 13 Ma and before ca. 4 Ma; this eastward down-tangling appears to be a discrete event and may mark the change from extension to transtension.

This detailed geologic mapping and collection of structural data for the rocks in the eastern Argus and northern Slate Ranges and Panamint Valley were created using digital in-the-field geographic information systems software running on a field-hardened laptop computer. This map is a simplification of detailed geologic mapping data collected at 1:6000 scale and reduced to 1:20000 scale. Structural data includes kinematic and relative timing of deformation information.

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REFERENCE CITED

(2) In the mouth of Millspaugh Canyon. A megabreccia deposit of
Contacts

/Meta-Angesite Hornfels and Mylonite (Late(?) Jurassic)

– Light

– A few exposures of rhyolitic

– A basalt

BASAL TIC INTRUSION (middle Miocene)

Buttress unconformities in Panamint Valley near the mouth of

(A) Andrew and Walker, 2009). These deposits are interpreted to be related

Porphyritic quartz monzonite clasts instead of granodiorite clasts.

Range, except for lesser abundance basalt clasts. The basalt clasts

the green calcsilicate clasts only occur there. The clast assemblage of

meta-calcsilicates laminated on a centimeter-scale with gray


Unit is the Keeler Canyon Formation and not of the time-equivalent Bird

/fissile light-yellow-brown to pinkish brown siltstone with interbeds of

horses and as pods of mylonitic marble along the Argus-Sterling thrust,

mosaic of quartz and feldspar (Moore, 1976). A sample of this unit from

matrix. Moore (1976) classified this unit as post-tectonic in the Argus

plagioclase and quartz in an aphanitic white-gray matrix. Moore (1976)
supported). Felsic meta-ignimbrites with preserved eutaxitic textures

Canyon granite to the south of the map area and was interpreted by
