

the most extensive rocks in the quadrangle are Tertiary volcanic units. These include regional ash-flow tuffs (Needles Range Group, Isom Formation, Quichapa Group, and Racer Canyon Tuff) from calderas outside the area to the NW and W, more local ash-flow tuffs (Rocks of Paradise and Rencher Formations) derived from Iron Axis laccoliths to the south, and local volcanic rocks from vents within the map area. In the map area the volcanic rocks generally get younger from west to east (Needles Range, Isom, Quichapa, Rocks of Paradise, Rencher, and Racer Canyon). In the east the 19 Ma Racer Canyon Tuff is subhorizontal. Erosion of the east-tilted fault-block resulted in semi-consolidated, late-Miocene (~8-9 Ma) alluvial deposits located in the southwest. The youngest igneous rocks are sub-horizontal to gently east-dipping basalts also restricted to the southwest.

Historically, K/Ar mineral dates provide the main age constraints on the Miocene volcanic stratigraphy and Iron Axis magmatism of this region. We present the results of $^{40}\text{Ar}/^{39}\text{Ar}$ incremental release dates on plagioclase separated from six volcanic samples collected in the Pinto Quadrangle. The age of the Harmony Hills tuff (Quichapa Group), a key unit deformed by all of the intrusions, is only poorly constrained by six prior K/Ar dates ranging from 24.4 to 20.3 Ma. We obtained a well-defined plateau age (8 steps constituting 91% of the total ^{39}Ar) of 22.03 ± 0.15 Ma. This date is indistinguishable from a 21.93 ± 0.07 Ma date ($^{40}\text{Ar}/^{39}\text{Ar}$, biotite) reported for the immediately overlying ash-flow tuff member of the Rocks of Paradise Formation (Hacker et al., 1997, GSAA). We also obtained a well-defined plateau age of 21.83 ± 0.17 Ma (4 steps, 55% total ^{39}Ar) on the Rencher Formation (and concordant isochron age of 21.46 ± 0.40 Ma) which directly overlies the Rocks of Paradise. These data tightly constrain the age of several key volcanic units in the area as well as their sources to the south and west (Stoddard Mountain, Pinto Peak, and Bull Valley intrusions). Unfortunately, four of our samples gave U-shaped, discordant, age spectra suggesting either the presence of excess argon or xenocrystic contamination. The least contaminated sample (an east-tilted capping basalt at the southwestern end of the map area; Gum Hill) yielded a minimum age increment of 5.7 Ma which we interpret as a maximum age for the rock. If correct, this interpretation suggests that some of the Miocene capping basalts throughout the area may be younger than indicated by prior K-Ar ages (i.e., ~7.7 Ma, Bull Valley Mountains, Best and others, 1980, AJS).

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ERSKINE, M.C.

Extensional tectonics in a regional thrust belt – a simplified structural model for the interpretation of the central Basin and Ranges in Utah and Nevada.

During the Mesozoic, the sedimentary rocks of the miogeocline of western Utah and eastern Nevada were thrust eastward over the North American continental margin. During the Cenozoic, this folded and thrust terrain extended westward, essentially opposite to Mesozoic vergence. The miogeocline consists of Eocambrian to Jurassic paraconform-

able sedimentary rocks over 12 kilometers (40,000 feet) thick in western Utah and eastern Nevada.

Stratigraphic/structural Relief across the twenty mile width of Steptoe Valley, between outcrops of the Jurassic Navajo (Aztec) Sandstone at Curry Junction and outcrops of Eocambrian quartzite north of Cherry Creek, is as much as twelve kilometers. Clasts of Prospect Mountain Quartzite in the basal conglomerate of the Cretaceous(?) to Eocene Sheep Pass Formation indicate at least seven and a half kilometers of EXPOSED stratigraphic relief by early Sheep Pass time.

Regional Outcrop Patterns – The major mountain ranges (Fish Springs/House/Wah Wah Range; Raft River/Pilot/Goshute/Deep Creek Range/Snake/Highland; Ruby/White Pine/Grant/Quinn Canyon/Groom Range; Toiyabe Range) form antiformal linear structural culminations. Cambrian quartzite and older sedimentary rocks are in the core. The ranges are separated by synclinoria of structurally dismembered younger sedimentary rocks (Confusion Range; Buttes Range; Sulphur Springs-Monitor Ranges). The synclinoria show significant packages with clear westward structural vergence on their eastern limb. These synclinoria preserve miogeoclinal sedimentary rocks as young as Jurassic Navajo Sandstone in their cores (Buttes Range Synclinorium near Curry, Nevada). Outcrops of Cretaceous sedimentary rocks are rare and consist of nonmarine clastics. Outcrops of pre-miogeocline crystalline basement are rare beneath the thick sections of Eocambrian clastic rocks.

Structural Models – This poster presents a series of simplified balanced cross sections illustrating a model of Basin and Range tectonic development in time and space. The model demonstrates that the key to understanding of the Basin and Ranges tectonic development lies in understanding the style of Mesozoic thrusting.

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Temporal and spatial patterns of extension along the southern boundary of the Transition Zone, Superstition volcanic field, Arizona

The 20.5 – 18.0 Ma 5,000 km² Superstition volcanic field straddles the Transition Zone – Basin and Range structural boundary in central Arizona. High-precision, sanidine, single crystal, laser fusion $^{40}\text{Ar}/^{39}\text{Ar}$ dating of key volcanic units provide a detailed chronology of the evolution of tilt domains and magnitudes of extension throughout the life of the field. In the Transition Zone, even the oldest volcanic strata are either undeformed or only gently tilted, but locally, fanning dip sequences in narrow grabens are preserved. In the Basin and Range, northeast tilting began at about 20.5 Ma and was fairly evenly distributed along closely spaced faults throughout the field until eruption of Apache Leap Tuff at 18.6 Ma. Tilting ceased in most areas by 18.6 Ma, but continued along discrete zones, locally very rapidly, until about 18.0 Ma.

The E-W elongated 350 km² Superstition cauldron (source of the Apache Leap Tuff), lies in the northwestern corner of the field and is bisected by the southwestern structural boundary of the Transition Zone. Northwest of the cauldron, the boundary fault zone was active until about 18.0 Ma, and southwest-side-down normal motion was accompanied by