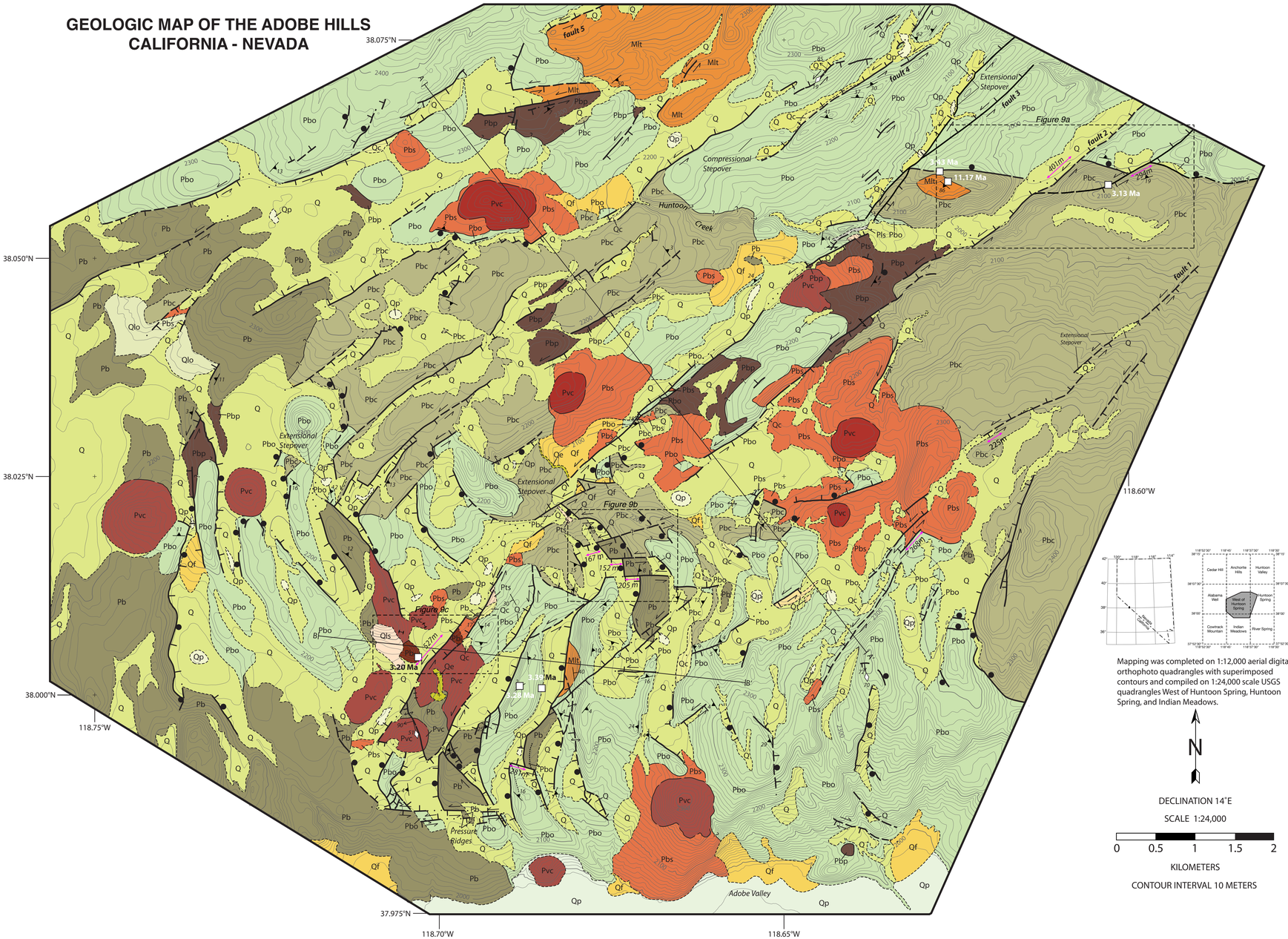
GEOLOGIC MAP OF THE ADOBE HILLS CALIFORNIA - NEVADA



Mapping was completed on 1:12,000 aerial digital orthophoto quadrangles with superimposed contours and compiled on 1:24,000 scale USGS quadrangles West of Huntoon Spring, Huntoon Spring, and Indian Meadows.

DECLINATION 14°E

SCALE 1:24,000

0 0.5 1 1.5 2

KILOMETERS

CONTOUR INTERVAL 10 METERS

EXPLANATION

Sedimentary and Volcanic Units

Quaternary

- **Qe** — **Eolian tuffaceous sand.** White sand containing tabular pumice fragments up to ~ 8 mm, glass shards, and quartz grains.
- **Q** — **Undifferentiated sediments.** Eolian tuffaceous sand, fan deposits, and playa deposits following Reheis et al. (2002)**.**
- **Qt** — **Terrace.** Fluvial sediments deposited upon basalt bedrock proximal to a channel.
- **Qp** — **Playa deposits.** White silt to mud-sized shallow-water playa deposits.
- **Qf** — **Fan deposits.** Angular basalt cobbles to boulders and eolian tuffaceous sand that define a convex up, fan morphology.
- **Qls** — **Landslide deposits.** Angular basalt cobbles to boulders that define a hummocky surface.
- **Qc** — **Basalt colluvium.** Angular basalt cobbles to boulders sourced up slope; common near fault scarps.
- **Qlo** — **Beach gravel.** White, chalky, massive carbonate deposits mantling basalts in the western Adobe Hills. Gravel-sized clasts and gastropod fossils are common. This unit is interpreted to represent middle to early Pleistocene high stands of Mono Lake (Reheis et al., 2002).

Pliocene

- **Pbs** — **Basalt scoria.** Red and black scoria deposits ranging in size from near sand to cobble with scarce phenocrysts of olivine, pyroxene, and plagioclase. Sourced from nearby volcanic center.
- **Pvc** — **Volcanic center.** Red weathering, commonly cone-shaped volcanic center with smaller than pebble sized basalt cinder, pebble to cobble-sized scoria, and volcanic bombs and blocks, and vesicular breccia blocks.
- **Pbc / Pbo / Pbp → Pb** — **Basalt lava. Pbp**—Brown to tan weathering, light to medium gray, weakly phyric (~ 1%) basalt lava. Phenocrysts consist of euhedral, translucent plagioclase within a crystalline groundmass. **Pbo**—Brown weathering, light to dark gray, flaggy, weakly phyric (< 1%) basalt lava. Phenocrysts consist of euhedral to subhedral olivine (1-2 mm) and pyroxene (1-2 mm) in a microcrystalline groundmass. $^{40}Ar/^{39}Ar$ geochronology on basalt groundmass records ages of 3.28 ± 0.03 Ma and 3.39 ± 0.03 Ma. **Pb,**—Basalt lava rubble characterized by rounded cobble to boulder-sized clasts of black, vesicular, phyric basalt. Phenocrysts include zoned pyroxene, olivine, and plagioclase in a coarse crystalline groundmass. $^{40}Ar/^{39}Ar$ geochronology on basalt groundmass yields an age of 3.20 ± 0.03 Ma. **Pbc**—Red to brown weathering, light to dark gray, phyric basalt lava. Phenocrysts consist of 5-10% glomerocrysts of euhedral to subhedral pyroxene (1-7 mm) and olivine (1-4 mm), and trace plagioclase phenocrysts (<1 mm) in a crystalline groundmass. $^{40}Ar/^{39}Ar$ geochronology on basalt groundmass yields ages of 3.13 ± 0.02 Ma and 3.43 ± 0.01 Ma. **Pb**—Undifferentiated basalt lava.
- **Pts** — **Tuffaceous sandstone.** Tan to light orange weathering, tan to brown, fine- to medium-grained, poorly sorted, moderately friable, tuffaceous sandstone comprised of 10% angular to subangular tabular pumice clasts (1-4 mm), 3% angular and subrounded obsidian, and scoria lithics (1-2 mm).
- **Pls** — **Lacustrine sediments.** Alternating beds of tan cross-bedded sandstones and white, silt-sized siliceous lake deposits underlying basalt lavas.

Miocene

- **Mlt** — **Latite ignimbrite.** Unwelded to welded, biotite-bearing latite ignimbrite deposits variable in color. The unwelded ignimbrite underlies basalts in the southern Adobe Hills and is dark brown to ashy black, friable, and contains 4% subrounded basalt (4-5 mm), subangular red granite (~3 mm), and wood lithics. Minerals include 0.5% euhedral biotite (<1 mm) and 0.5% subhedral plagioclase (1-2 mm). Visible flow features are absent. The welded ignimbrite, which is a ridge-former mantled by younger basalt lavas in the northern Adobe Hills, is white, pink, or dark gray in color, porphyritic with gray to dark gray angular basalt lithics up to 30 mm in diameter. Phenocrysts include ~1% euhedral-subhedral biotite (1-2 mm) and ~1% gray to clear plagioclase (1-2 mm) within an aphanitic groundmass. Some flows exhibit eutaxitic texture. $^{40}Ar/^{39}Ar$ geochronology on plagioclase yields an age of 11.17 ± 0.04 Ma for this unit.

SYMBOLS

Contacts

Solid where well-located (≤10m), dashed where approximately located (≤20m), dotted where concealed, queried where speculative. Arrow indicates contact dip direction and magnitude.

Unit Q contact.

Faults

Normal fault, ball and hachures on hanging wall; solid where well located (≤10m), dashed where approximately located (≤20m), dotted where concealed. Double-pronged arrow indicates fault plane dip direction and magnitude; diamond-headed arrow shows trend and plunge of fault striation.

Strike slip fault, paired arrows indicate relative sense of lateral slip, hachures on relative downthrown side; solid where well located (≤10m), dashed where approximately located (≤20m), dotted where concealed.

527m — magnitude of lateral offset

Intrusive rocks

dike

Attitudes

bedding

flow foliation

Geochronology

$^{40}Ar/^{39}Ar$ sample location and age in Ma