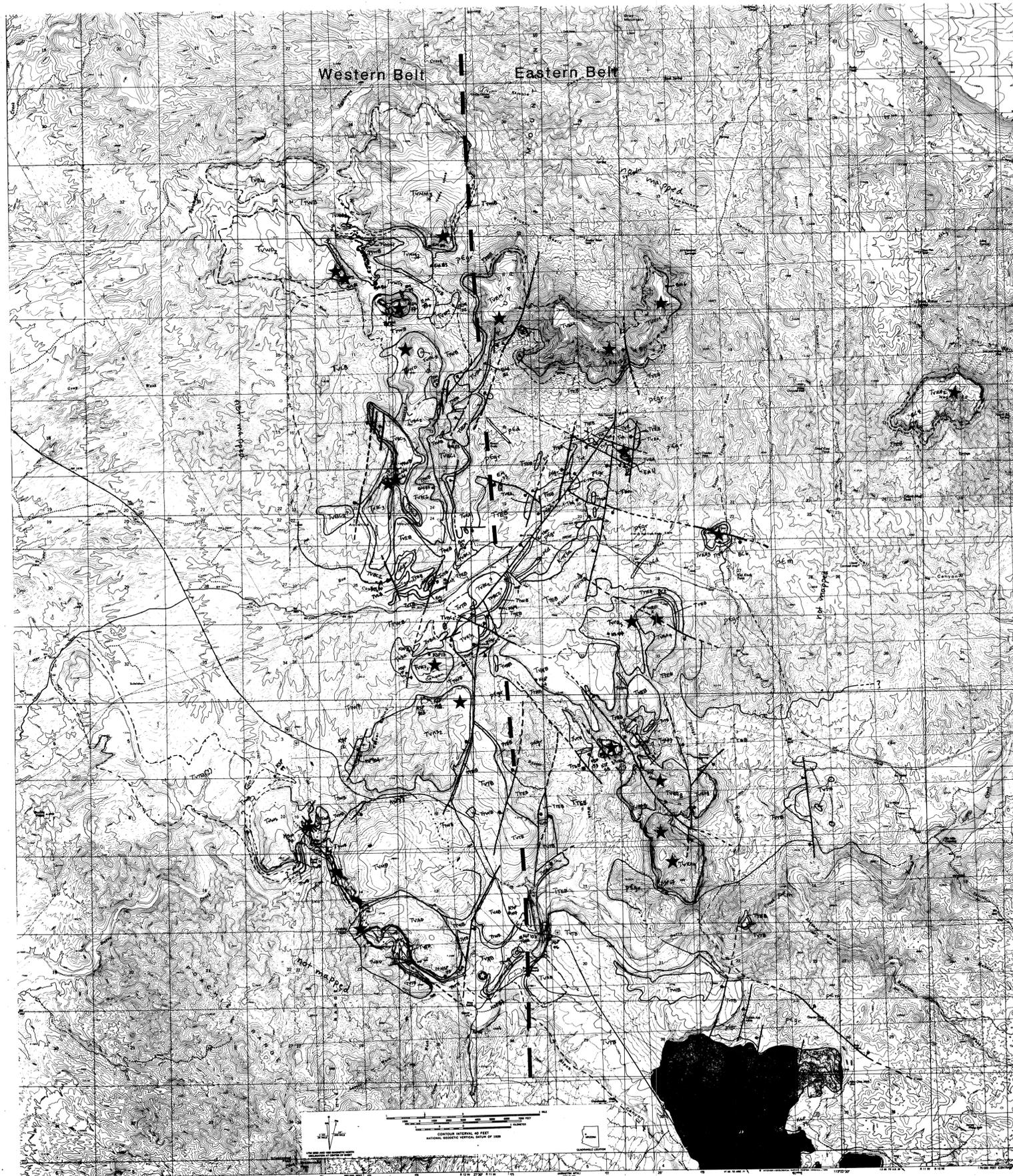


GENERALIZED GEOLOGIC MAP OF THE KAISER SPRING VOLCANIC FIELD

1990

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WESTERN SILICIC VOLCANIC ROCKS

- Tvnm₃** Heale Mesa rhyodacite. Flow-foliated, reddish, crystalline lava with a vitric base. Lava is porphyritic, containing phenocrysts of plagioclase, hornblende, and hypersthene.
- Tvnm₂** Flow-foliated, reddish, crystalline lava with a vitric base. Exposed south of Heale Mesa. Rhyodacite contains phenocrysts of plagioclase, hornblende, and hypersthene, plus augite.
- Tvnm₁** Poorly-exposed, reddish crystalline lava exposed south of Heale Mesa.
- lvsh** Crystalline lava that caps the prominent butte between the Burro Cliffs and Heale Mesa. Rhyodacite contains phenocrysts of plagioclase, hornblende, and hypersthene; a vitric base is preserved.
- Tvwd₂** The rhyodacite of West dome (the prominent butte west of Heale Mesa). Flow-foliated, crystalline lava with a preserved vitric base. Rhyodacite lava has phenocrysts of plagioclase, hornblende, and hypersthene.
- Tvwd₁** Western belt rhyolite. Flow-foliated, crystalline lava that underlies the rhyodacite of West dome and Tvbc (the presumed stratigraphic equivalent of Tvbc), and overlies a lava associated with the Elephant Mountains. Rhyolite has a vitric base and contains phenocrysts of plagioclase, biotite, hornblende, and hypersthene.
- Tvnd** Rhyodacite of North dome. Flow-foliated, crystalline lava that comprises the northern end of the Burro Cliffs. This unit is overlain by either Tvbc or Tvbc₃. Rhyodacite contains phenocrysts of plagioclase, biotite, and hornblende; unit has a vitric base.
- Tvbc₃** Upper Burro Cliffs member. Flow-foliated, crystalline lava flow approximately 20 m thick, that forms the upper set of cliffs on the Burro Cliffs. Rhyodacite has a vitric base and contains phenocrysts of plagioclase, hornblende, and hypersthene.
- Tvbc₂** Middle Burro Cliffs member. Flow-foliated, crystalline lava flow, approximately 20 m thick, that forms the middle set of cliffs on the Burro Cliffs. Rhyodacite has a vitric base and contains phenocrysts of plagioclase, hornblende, and hypersthene.
- Tvbc₁** Lower Burro Cliffs member. Flow-foliated, crystalline lava that underlies the Burro Cliffs. This unit, which directly overlies distal Elephant Mountain lava, includes several stratigraphically equivalent outcrops, all of which are presumably equivalent to Tvbc. Rhyodacite contains large phenocrysts of plagioclase, and phenocrysts of plagioclase, augite, hypersthene, and hornblende; a vitric base is locally preserved.
- Tvbd** Massive to stratified, monolithic breccia containing cobbles of crystalline lava. Lava contains large plagioclase phenocrysts, and phenocrysts of plagioclase, augite, hypersthene, and hornblende.
- Tvks₂** Kaiser Spring dome. Flow-foliated, crystalline lava that comprises the prominent butte southeast of Kaiser Spring. Lava has a vitric base and contains mafic pillows. Rhyodacite has phenocrysts of plagioclase, biotite, and hornblende. Distal sections are comprised of a distinctive monolithic, pumiceous, lava breccia shed from the toe of the lava flow.
- Tvks₁** Flow-foliated, crystalline lava that forms the flank dome to Kaiser Spring dome. This unit overlies lava equivalent to either Tvbc₂ or Tvbc₃. The rhyodacite, which has a vitric base, contains mafic pillows and phenocrysts of plagioclase, biotite, and hornblende.
- Tvws** Warm Spring rhyolite. Flow-foliated, crystalline rhyolite that forms the dome near Warm Spring. This unit, which overlies Tvnd and Tvbd and underlies Tvks, erupted along the major basement fracture exposed in Kaiser Spring Wash. The rhyolite contains phenocrysts of plagioclase, sanidine, quartz, and biotite.
- Tvmd** Rhyodacite of Middle dome. Flow-foliated, crystalline lava that erupted from the major basement fracture along Burro Creek. This unit overlies Tvnd and underlies Tvws. The rhyodacite has a vitric base, and contains phenocrysts of plagioclase, biotite, and hornblende.
- Tvad** Rhyodacite of Andy's dome. Flow-foliated, crystalline lava extruded from the major basement fracture along Burro Creek. This unit overlies Tvbd and underlies Tvmd. The rhyodacite of Andy's dome has a vitric base and contains phenocrysts of plagioclase, biotite, and hornblende.
- Tvwb** Undivided tuffaceous deposits associated with the eruptive centers of the western silicic volcanic belt. Deposits include debris flow units, pyroclastic-flow and -surge deposits, and minor pumice falls. Locally derived fluvial deposits are also included.

EASTERN SILICIC VOLCANIC ROCKS

- Tvem** Rhyolite of the Elephant Mountains. Undivided high-silica rhyolite lava domes and flows that have a thin vitric base underlying pinkish-gray, devitrified, lithophysal lava. Lava is porphyritic, containing phenocrysts of oligoclase, sanidine, quartz, and biotite. Vapor phase minerals include quartz, garnet, and rare topaz.
- Tvra₉** Aphyric rhyolite of the southern burro complex. High-silica rhyolite domes that have a thin vitric base overlain by pinkish-gray, flow-foliated, devitrified, lithophysal lava. Lava is essentially aphyric. Vapor phase minerals include quartz and garnet.
- Tvra₈** Aphyric rhyolite of the northern burro complex. High-silica rhyolite domes that have a thin vitric base overlain by pinkish-gray, flow-foliated, devitrified, lithophysal lava. Lava is essentially aphyric. Vapor phase minerals include quartz and garnet.
- Tvra₇** Aphyric rhyolite breccia that crops out below the the basalt-capped mesa north of the burro complex.
- Tvra₆** Aphyric lava dome of Hell's Half Acre. Small high-silica rhyolite dome that has a thin vitric base overlain by pinkish-gray, devitrified lava. Lava is essentially aphyric.
- Tvra₅** Lower member of the Woodrock complex. Vitric, flow-foliated, high-silica lava. Lava contains sparse microphenocrysts of oligoclase, sanidine, and biotite.
- Tvra₄** Upper member of the Woodrock complex. High-silica rhyolite dome that has a thin vitric base overlain by pinkish-gray, flow-foliated, devitrified, lithophysal lava. Lava contains sparse microphenocrysts of oligoclase, sanidine, quartz, and biotite. Vapor phase minerals include quartz and garnet.
- Tvra₃** Red Knob dome. High-silica rhyolite dome that has a thin vitric base overlain by pinkish-gray, flow-foliated, devitrified, lithophysal lava. Lava contains sparse microphenocrysts of oligoclase, sanidine, quartz, and biotite. Vapor phase minerals include quartz and garnet.
- Tvra₂** Negro Ed dome. High-silica rhyolite dome that has a thin vitric base overlain by pinkish-gray, flow-foliated, devitrified, lithophysal lava. Lava contains sparse microphenocrysts of oligoclase, sanidine and biotite. Vapor phase minerals include quartz, garnet, and topaz.
- Tvra₁** Box Canyon lava. Remnants of a high-silica rhyolite lava flow that has been faulted and eroded. This unit, which crops out south of Elephant Mountain, has a vitric base overlain by devitrified lava. Contains sparse microphenocrysts of oligoclase, sanidine, quartz, and biotite.
- Tvr** Undivided, poorly preserved silicic lavas. Crop out in Burro Creek Canyon.
- Tkb** Undivided tuffaceous deposits associated with the eruptive centers of the eastern silicic volcanic belt. Deposits include pyroclastic-surge and -flow units, minor debris-flow units, base of the deposit locally contains arkose and lacustrine deposits. Includes rare thin basalt interbeds.

BASALTIC LAVAS

- Tvab** Alkalic basalt. Forms thin (<10 m) lava flows. Contains phenocryst of olivine and plagioclase in a crystalline matrix of plagioclase, clinopyroxene, and minor olivine.
- Tvbt** Tholeiitic basalt. Forms thin (<10 m) lava flows that have locally preserved scoriaceous tops and bottoms. Contains phenocrysts of olivine, olivine and plagioclase, or olivine, plagioclase, and clinopyroxene. Groundmass is crystalline, comprised of plagioclase, clinopyroxene, and in some cases, minor olivine.
- Tvba** Quartz-bearing basaltic andesite. Crops out in one locality west of Kaiser Spring dome. Occurs as a scoriaceous lava that contains phenocrysts of olivine, clinopyroxene, and plagioclase in a crystalline groundmass of plagioclase and clinopyroxene. Contains anhedral phenocrysts of quartz surrounded by clinopyroxene reaction rims.
- Tvbu** Undivided basaltic lavas.
- K-Tba** Reddish, weathered mafic lava of unknown age. Forms platy habit; lies directly on basement. Contains green titanite and relict olivine microphenocrysts in an altered matrix.

Rock Unit Descriptions

BASEMENT LITHOLOGIES

- p6d** Diabase dikes. Cut all other crystalline basement rocks. Occurs as massive, dense, medium-grained, greenish-gray rock; altered to greenstone.
- p6gr** Undivided granitic rocks. Generally equigranular (but may be mildly porphyritic) leucocratic rocks cut by quartz veins, pegmatites, and felsic dikes. Likely represent more than one pluton.
- p6m** Undivided metamorphic rocks. Comprised of schist, gneiss, and greenstone. Presumably correlate with the Yavapai Series.

**NOTE: The order of rock unit descriptions does not necessarily reflect stratigraphic position.

Symbols

- Basalt Vents
★ Denotes the known or inferred position of vents.
- Fault, bar and ball on downthrown side.
- - - Contact, dashed where inferred.
- Sample Location.

Base map taken from portions of the following USGS 7 1/2 minute topographic series maps: Kaiser Spring, Elephant Mountain, Greenwood Peak, Utkieup, Negro Ed, and Grayback Mountain.

Geology by T.C. Moyer 1979-1984.