OPEN-FILE REPORT 0-93-5
PRELIMINARY GEOLOGIC MAP OF THE
RINEHART CANYON QUADRANGLE
MALHEUR COUNTY, OREGON

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This unpublished Open-File Report has not been reviewed and may not meet all Oregon Department of Geology and Mineral Industries' standards.

Field work conducted in 1986/1992
Map Scale: 1:24,000

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The study area is underlain by flat-lying or gently dipping volcanic, sedimentary and pyroclastic rocks of late Miocene to Holocene age. These deposits fill the central part of the Ore-Ida Graben (Ferns and others, 1993). Oldest rocks exposed include the rhyolite and ashflow tuff at Iron Point (Trip), basaltic andesite flows (Tbwc) and sedimentary and pyroclastic rocks (Tsb). At Iron Point, the Trip rhyolite is 360 m thick and consists of at least two cooling units separated by nonwelded tuff and lithic ash-flow tuff. In the western part of the quadrangle, the Trip rhyolite is overlain by 12 Ma olivine basalt and plagioclase-phynic ferroandesites (Tbmv).

Poorly to moderately lithified sedimentary and pyroclastic rocks (Tsb) interfere with the Trip rhyolite to the south. Maximum uninterrupted Tsb thickness south of the quadrangle boundary at Chalk Basin is 150 m (Evans, 1990). Tsb sediments include bentonitic clays and oolitic limestones, suggestive of a lacustrine environment. Shrinkage cracks in clay-rich siltstone suggest that part of the basin were subject to periodic desiccation.

Upper Miocene and lower Pliocene basalt flows (Tbwb) overlie and interfer with Tsb sediments near Hoot Owl Spring. The flows are olivine basalts which erupted from vents west of the quadrangle boundary. Still younger Pliocene and lower Pleistocene basalt flows (Q1b) erupted from small shield volcanoes east and west of the quadrangle, forming a broad, flat plateau at about 4 Ma. The Owyhee River began to cut down through the plateau at about 1.5 Ma. Young intracanyon basalt flows (Qb and Qbbr) partially filled the Owyhee paleocanyon. These young basalts include alkali-olivine and high-alumina olivine basalts (Hart and Mertzman, 1983). Large landslides (Q1s) have formed where the Owyhee River has cut through and exposed weakly lithified tuffaceous sediments below the basalt flows.
Unconsolidated deposits of sand and gravel deposited along the Owyhee River.

Landslide deposits

Alluvial fan deposits (Quaternary) Mainly unconsolidated and poorly sorted accumulations of coarse gravel deposited along the flanks of Cedar Mountain.

Basalt of Bogus Rim (Holocene? or Pleistocene) Grayish black to black olivine basalt flow. Age based on geomorphic relationships. Flows fills part of the canyon of the ancestral Owyhee River. Equivalent to unit QTb of Plumley (1986) and unit Qb of Walker and MacLeod (1992).

Fluvialite sands (Pleistocene or Pliocene) Unconsolidated deposits of sand, gravel, and silt, presumably deposited during downcutting of the Owyhee Canyon.

Basalt of Sand Basin (Pleistocene or Pliocene) Reddish-weathering, dark grayish black, plagioclase-phyric olivine basalt flow. Intercanyon flow emplaced early during downcutting of the Owyhee canyon. Hyalopilitic with 2mm plagioclase phenocrysts, 1mm olivine phenocrysts in a groundmass of plagioclase, intergranular clinopyroxene, glass, and opaques. Contains high abundances of TiO2 and K2O (Sample AZB-117, Table 1) which are characteristic of alkali olivine basalts using the terminology of Hart (1982).

Lacustrine sediments (Quaternary) Mainly unconsolidated eolian and lacustrine deposits of light colored, fine-grained sand and silt. Interpreted as shore-line facies marginal to a large pluvial Pleistocene lake to the west (Ferns and Williams, 1993).

Olivine basalt (Pliocene?) Gray and grayish-black diktytaxitic olivine basalt flows with well preserved flow tops. Locally heavily mantled by windblown silt. Includes holocrystalline basalts with less than 2% olivine phenocrysts as large as 3mm in diameter in a groundmass of interlocking plagioclase lathes and subophitic clinopyroxene. Includes high alumina basalts. Pliocene date based on K/Ar determinations of 4.1 and 4.5 Ma by Hart (1982). Equivalent to part of unit QTb of Walker and MacLeod (1991).
Unconsolidated fluvial and lacustrine deposits (Pliocene?) Unconsolidated accumulations of sand, silt, and gravel separating QTb from underlying Tbwb flows. Upper part of section contains caliche deposits.

Olivine basalt flows of Wrangle Butte (Pliocene and upper Miocene?) Bluish and grayish-black, olivine basalt flows and interbedded palagonitic breccias. Includes hyalophitic pillow basalts with 2 mm diameter olivine and plagioclase phenocrysts with ophitic and subophitic clinopyroxene. Chemically, includes quartz tholeiites (Ferns, 1993c). Equivalent to part of unit Tb of Evans (1991) and QTb of Walker and MacLeod (1991).

Basaltic andesite (Pliocene or Late Miocene) A single flow of aphyric, bluish black platy basaltic andesite. Presumably correlative with basaltic andesite flows off of Cedar Mountain.

Tuffaceous siltstones, sandstones, and ashflow tuff (Late Miocene) Mainly pale yellowish-white to white, tuffaceous siltstones. Includes a 4' thick densely-welded, lithic, quartz-latite tuff in Rinehart Canyon (Analyses 4, Table 1). Also includes sandstone, conglomerate, bentonitic clay, chert, limestone, and cherty limestone. Unit includes a thin vitric welded tuff in the Sacramento Butte quadrangle to the southwest which is correlated by Ferns (1992b) with the 9.2 Ma Devine Canyon Ash-Flow Tuff of Greene and others (1973).

(Late Miocene) Bluish-black to bluish-gray, platy tholeiitic andesite, basaltic andesite, and basalt flows. Includes distinctive glomeroporphyrritic flows with plagioclase phenocrysts as large as 2 cm in diameter, plagioclase and orthopyroxene glomerocrysts, and rare quartz xenocrysts. At least three flows with an aggregate thickness of 200 feet exposed in the Mustang Butte quadrangle, where analyses show high abundances of K2O and a large degree of iron enrichment (Ferns, 1992a). Xenocryst-bearing flows are petrographically and chemically similar to the Square Mountain ferro-latite (Bonnichsen and others, 1988).
Rhyolite at Iron Point (late Miocene?) Sequence of rhyolite flows and ashflow tuffs exposed at Iron Point. Includes at least two thick rhyolite flows. Lower flow is a reddish-gray, porphyritic rhyolite with a perlitic vitrophyre carapace. Both flows are dark-gray to reddish-gray and contain sanidine, quartz, and plagioclase phenocrysts. Lower flow contains dark brown pleochroic phenocrysts of aenigmaticite. Basal vitrophyre of uppermost flow is peralkaline in chemistry (Analysis AZB-116, Table 1) while the lower flow is meta-aluminous (Analyses AZB-119, Table 1). Aggregate thickness of flows and tuffs is over 1000 feet at Iron Point where Evans (1991) identified a 720 foot thick basal ash flow overlain by a 360 foot thick upper unit.

| LAE # | 1/4 1/4 S. T.S. R.E. Elev. Lithology | Map Unit | SiO₂ | AI₂O₃ | TiO₂ | FeO | MnO | CaO | MgO | K₂O | Na₂O | PO₄ | LOI | Cr | Co | Ni | Cu | Zn | Rb | Sr | Y | Zr | Nb | Ba | Li | ppm |
|------|----------------------------------|----------|------|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----| ppm |
| A28-16 | NW SE 3 22 41 4600 Rhyolite | Trip | 76.5 | 11.5 | 0.11 | 1.45 | 0.08 | 0.03 | 0.21 | 0.22 | 4.35 | 4.04 | 0.04 | 0.54 | <10 | 45 | 5.8 | 121 | 264 | <10 | 173 | 264 | 117 | 151 | 97.9 | ppm |
| A28-117 | NE SE 27 27 41 3980 Olivine Lasait | Ob | 48.5 | 12.4 | 2.84 | 0.13 | 5.72 | 0.19 | 5.29 | 5.66 | 1.15 | 2.63 | 0.56 | 0.93 | 5.5 | 72 | 52.6 | 141 | 33 | 216 | 25 | 264 | 46 | 538 | 12.4 | ppm |
| A28-119 | SW SE 16 27 41 4100 Rhyolite | Trip | 73.5 | 12.5 | 0.31 | 2.06 | 0.21 | 0.08 | 1.34 | 0.44 | 5.22 | 5.59 | 0.09 | 1.08 | <10 | 45 | 14.2 | 35 | 166 | 88 | 62 | 230 | 25 | 724 | 10.3 | ppm |
| A28-83 | NW NE 24 27 41 3830 Ashflow tuff | Ttsca | 64.2 | 12.7 | 1.46 | 5.74 | 2.87 | 0.17 | 2.14 | 0.68 | 5.9 | 5.7 | 0.09 | 2.08 | <10 | 7 | 5 | 12.5 | 122 | 85 | 2 | 62 | 150 | 61 | 180 | 14.3 | ppm |
MAP SYMBOLS

Contact -- approximately located

Fault contact -- dashed where approximately located, dotted where concealed. Ball and bar on down throw side

Strike and dip of beds

Location of whole rock sample analyzed in Table 1
References


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\( \hat{\gamma} \) Strike and dip of beds

\( \checkmark \) Location of whole rock sample analyzed in Table 1