OPEN-FILE REPORT O-92-09
PRELIMINARY GEOLOGIC MAP OF THE JORDAN CRATERS SOUTH QUADRANGLE
MALHEUR COUNTY, OREGON
1992
BY MARK FERNS/NORMAN MACLEOD

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

JORDAN CRATERS SOUTH QUADRANGLE
OREGON—MALHEUR CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1968. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Oregon coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 11, shown in blue

Fine red dashed lines indicate selected fence lines

GN MN 0°18' 5 MILS 18½° 329 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

Field work conducted 1990/1991

Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery, and the U. S. Geological Survey COGEOMAP Program.

OREGON
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1973

JORDAN CRATERS SOUTH, OREG.
N4300—W11722.5/7.5
1969
AMS 2570 III SW—SERIES V892

OPEN-FILE REPORT O-92-09
PRELIMINARY GEOLOGIC MAP OF THE JORDAN CRATERS SOUTH QUADRANGLE MALHEUR COUNTY, OREGON

By M. L. Ferns, and N. S. MacLeod
Oregon Department of Geology and Mineral Industries

1992

This unpublished Open-File Report has not been reviewed and may not meet all Oregon Department of Geology and Mineral Industries' standards.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 1990/1991
Map Scale: 1:24,000

Funding Statement: Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery, and the U. S. Geological Survey COGEOMAP Program as part of a cooperative effort to map the west half of the 1^{O} by 2^{O} Boise sheet, eastern Oregon.

Jordan Craters South

A distinctive, densely-welded, high-silica rhyolite ashflow tuff (Ttlg?) comprises the oldest unit exposed in the Jordan Craters South quadrangle. The ashflow is characterized by high silica and low alumina abundances and is correlative with tuffs mapped by Plumley (1984) as Leslie Gulch Tuff in The Hole in the Ground quadrangle to the northwest. If his correlation is correct, Ttlg? is part of the outflow sheet erupted during formation of the Mahogany Mountain caldera to the northeast.

The ashflow is overlain by tuffaceous siltstones (Tsts) and aphyric platy andesite flows (Tmv). Tilted fault blocks comprised of all three units from steptoes around which younger basalts (Tbdb, Tbtm, QTb, Qbcb, Qbrb, and Qbjc) have flowed. The youngest of these (Qbjc) erupted at about 3,000 years ago from a small vent north of the quadrangle at Jordan Crater. The surface of the Qbjc flow is free of wind-blown silt and soil and contains many fragile surface features that are characteristic of very young basalt flows.

JORDAN CRATERS SOUTH

Qc — Colluvial deposits (Quaternary) Slope covering deposits of angular blocks of basalt from rim forming basalts of units QTbbr, Tbab and Tdb.

Qa — Lacustrine and eolian deposits (Quaternary). Unconsolidated lacustrine and eolian deposits of silt and fine sand accumulated in shallow pans peripheral to young basalt flows.

Qbjc — Basalt of Jordan Craters (Holocene) Black iridescent vesicular olivine basalt flow with exceptionally well preserved tumuli, pahoehoe surfaces, and collapse structures. Fresh flow surfaces are exposed with no soil cover. In thin section, consists of 2-3mm olivine phenocrysts in a subophitic groundmass of plagioclase, clinopyroxene, and opaques. Chemically an alkali olivine basalt with a maximum age of 0.15 Ma, according to Hart (1982). Minimum age of 2800 years indicated by radiocarbon date from organic debris in upper Cow Lake (Mehringer, 1987).

Qbrb — Basalt of Rocky Butte (Quaternary) Dark gray diktytaxitic olivine basalt flows, with well preserved primary volcanic structures such as tumuli, pahoehoe surfaces, and collapse structures. In thin section, consists of olivine phenocrysts 3 mm in diameter and elongate plagioclase phenocrysts set in a subophitic groundmass of clinopyroxene, opaques, and glass. According to Hart (1982) the unit consists of alkali olivine basalt flows with a maximum age of 0.03 - 0.09 Ma.

Qbcb — Basalt of Clarks Butte (Pleistocene) Grayish-black olivine basal flows forming lava field about Clarks Butte. Well preserved tumuli, pahoehoe surfaces, and collapse structures are mantled by eolian and lacustrine silts. In thin section, consists of phenocrysts of olivine and plagioclase with glomerocrysts of plagioclase and olivine set in an intergranular groundmass of plagioclase, opaques, and clinopyroxene. Chemically an alkali olivine basalt radiometrically dated at 0.25 Ma (Hart, 1982).

QTb — Basalt (Pleistocene and Pliocene?) Vesicular gray diktytaxitic olivine basalt flows, mantled by soil and alluvial deposits. Basalt contains 2 mm olivine phenocrysts with subophitic titanaugite. Chemically a high alumina olivine tholeiite (Analyses, Table 1).

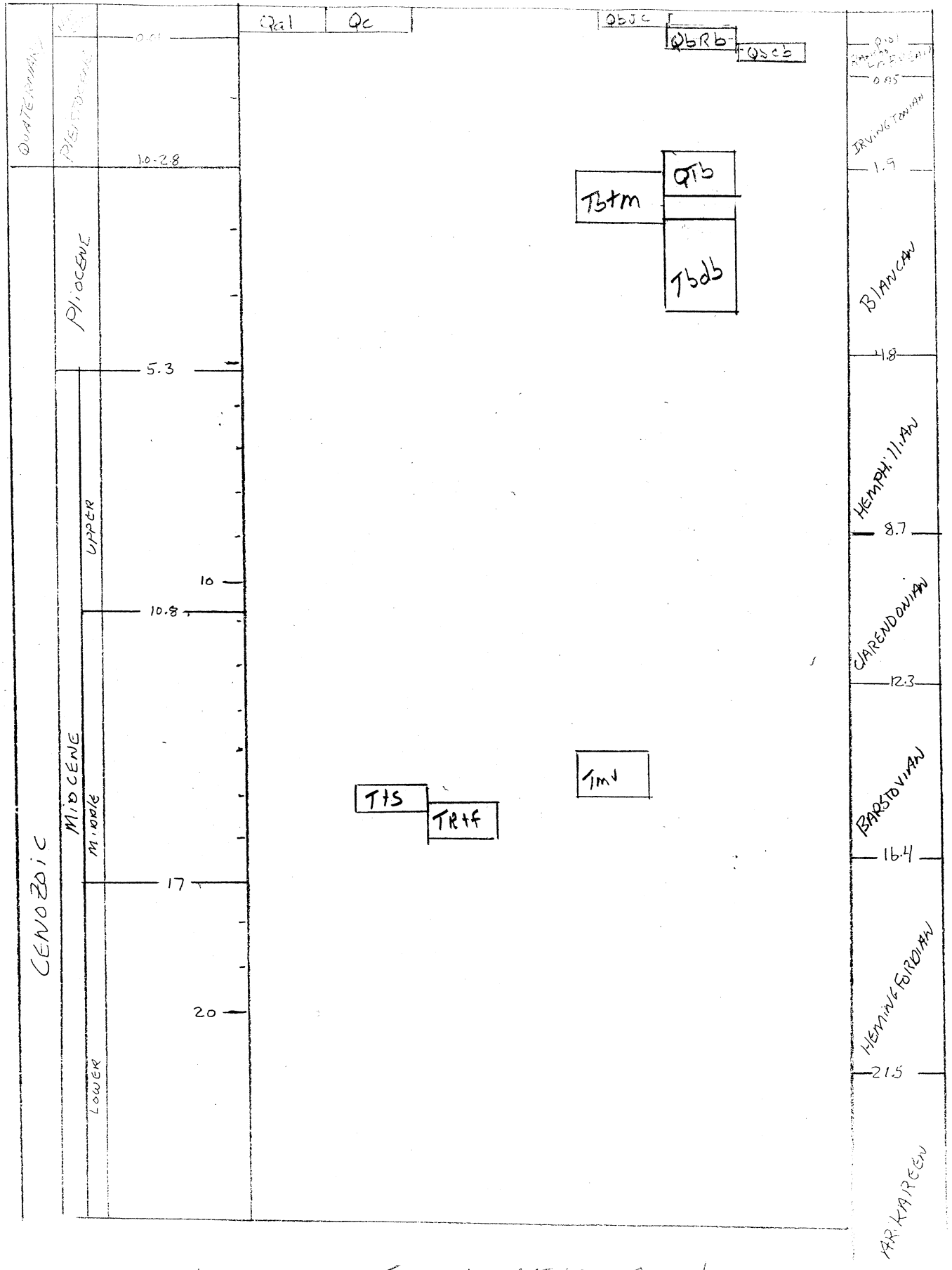
Tbtm — Basalts of Three Mile Hill (Pliocene) Vesicular black diktytaxitic olivine basalt flows. Includes holocrystalline flows with 3mm diameter plagioclase and olivine phenocrysts in an intergranular groundmass of plagioclase, olivine, clinopyroxene, and opaques. According to Hart (1982) includes alkali olivine basalt flows radiometrically dated at 1.9 Ma.

Tbdb — Basalts of Deer Butte (Pliocene) Grayish- and bluish-black diktytaxitic olivine basalt flows. Finely vesicular with subophitic to ophitic clinopyroxene, plagioclase, and intergranular olivine. Includes both transitional and high alumina olivine tholeiites according to the classification of Hart (1981). 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 (1977).

Tmv — Andesite and basaltic andesite (Miocene) Greenish-gray and reddish-gray, platy, aphyric basaltic andesite flows and unconsolidated deposits of agglutinate and cinders. Flows are pilotaxitic with plagioclase micro-phenocrysts.

Tts — Tuffaceous siltstones (Miocene) White to yellowish-white tuffaceous siltstones and diatomite. Yellowish tuffs grade downward into rhyolite flows of underlying unit Trtf.

Trtf — Porphyritic rhyolite (Miocene) Mainly densely welded, pale reddish-brown to gray, quartz-sanidine phyric, rhyolitic ashflow tuffs. Includes ashflows with 2 - 10% sanidine and quartz phenocrysts as large as 5mm in diameter. Chemically a high silica peralkaline rhyolite (Analyses, Table 1). Extremely high silica and low alumina abundances are characteristic of the Leslie Gulch Tuff where mapped by Plumley (1984) to the north.



JORDAN CRATERS South

LAB #	1/4	1/4	Sec.	T.(S.)	R.(E.)	Lithology	Unit	SiO2	Al2O3	TiO2	Fe2O3	MnO	CaO	MgO	K2O	NA2O	P2O5	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Nb	Ba	Li
								%	%	%	%	%	%	%	%	%		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
AZB-133	NW	SE	19	28	43	Olivine basalt	Tbdb	48.1	16.5	1.12	11.0	0.1	11.2	8.35	0.35	2.28	0.27	222	46	91	52.3	87.	14	326	15	64	28	624	6.6
AZB-134	NE	NW	20	28	43	Olivine basalt	QTb	47.9	16.9	1.13	10.9	0.1	11.6	8.54	0.39	2.57	0.20	275	47	140	68.2	75.	15	253	18	83	37	164	6.4

Hart, W.K., 1982, Chemical, geochronologic, and isotopic significance of low-K, high-alumina olivine tholeiite in the northwestern Great Basin, U.S.A.: Cleveland, Ohio, Case Western Reserve University doctoral dissertation, 410 p.

Hart, W.K. and Merzman, S.A., 1983, Late Cenozoic volcanic stratigraphy of the Jordan Valley area, southeastern Oregon: Oregon Department of Geology and Mineral Industries, Oregon Geology, Vol. 45, no. 2, p. 15-19.

Mehringer, 1987

Plumley, P.S., 1986, Volcanic stratigraphy and geochemistry of the Hole in the Ground area, Owyhee Plateau, southeastern Oregon: Moscow, Idaho, University of Idaho M.S. thesis, 161 p.

Walker, G.W., 1977, Geologic map of Oregon east of 121st meridian: U.S. Geological Survey Miscellaneous Investigations Map I-902, scale 1:500,000

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