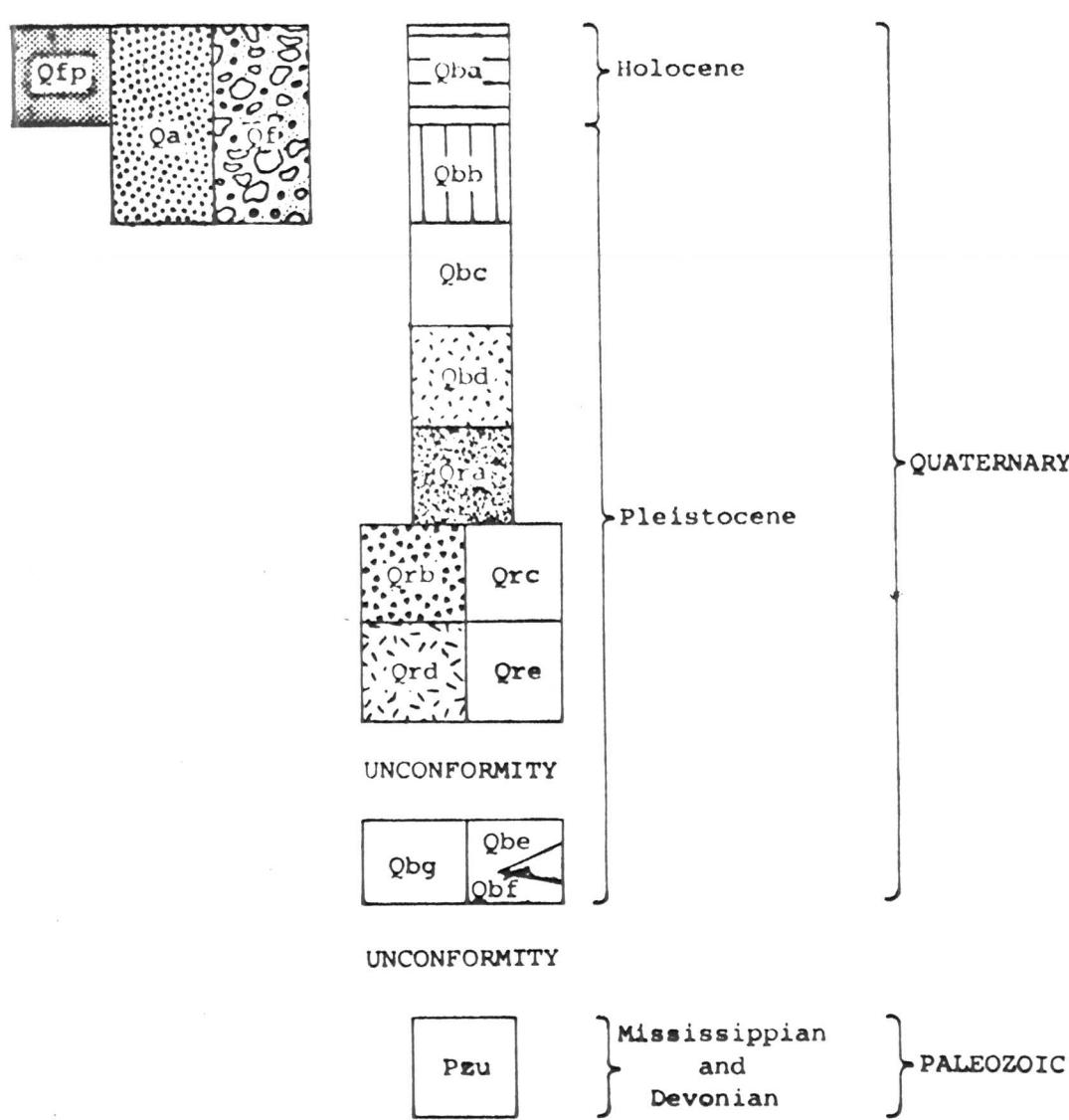


ARCO-BIG SOUTHERN BUTTE AREA, IDAHO

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

- Qfp** FLOOD PLAIN DEPOSITS OF THE BIG LOST RIVER (HOLOCENE AND PLEISTOCENE?)--Unconsolidated fluvial deposits of silt, sand, and pebble gravel on flood plain of Big Lost River
- Qe** ALLUVIUM (HOLOCENE? AND PLEISTOCENE?)--Unconsolidated sand and pebble gravel that forms fill terraces along the margins of the Big Lost River. Also includes deposits of silt and sand along margins of lava flows where stream drainages were obstructed
- Qf** COLLUVIAL AND TALUS FAN DEPOSITS (HOLOCENE AND PLEISTOCENE?)--Sand and gravel that form broad fans at the base of hills at the south end of the Lost River Range. Forms steep colluvial and talus fans on the lower slopes of Big Southern Butte
- Qba** BASALT LAVA FLOWS AND PYROCLASTIC DEPOSITS (HOLOCENE--YOUNGER THAN 12,000 YEARS OLD)--Fresh unweathered gray to black, tube-fed pahoehoe and aa lava flows, and bedded, moderately oxidized scoria, cinders, and ash, covered with little or no loess. All flows of this map unit were emitted from rift-controlled vents in Craters of the Moon National Monument or from rift-controlled vents near Big Southern Butte. Lava flows which emanated from vents in Craters of the Moon National Monument: the Sunset lava flow, Cerro Grande lava flow, North Robbers lava flow, and South Robbers lava flow, are of this map unit. Radiocarbon ages for soils buried by these lava flows range from about 2,000 ¹⁴C yrs to about 12,000 ¹⁴C yrs (Table 1)
- Qbb** BASALT LAVA FLOWS AND PYROCLASTIC DEPOSITS (UPPER PLEISTOCENE--ESTIMATED TO BE 12,000 TO 100,000 YEARS OLD)--Dark-gray to black, tube-fed pahoehoe lava flows and bedded, moderately oxidized scoria, cinders, and ash, locally covered by as much as 1 m of loess and eolian sand. Flows from a vent 5 km west of Arco (outside the area of this map) rest on and are partly buried by alluvial deposits (Qa) of late Pleistocene age (215,000 yrs). Flows from Crater Butte vent (sec. 17, T. 3 N., R. 28 E.) intertongue with fan deposits (Qf) at the southern end of the Lost River Range and with alluvial deposits (Qa) along the Big Lost River. A radiocarbon age of >40,000 ¹⁴C yrs was obtained from a soil buried by the lava flow of Quaking Aspen Butte (Table 1). Some lava flows were emitted from rift-controlled linear vents trending about N. 45° W. along the Big Lost River, others from rift-controlled vents trending approximately north-south through Rock Butte and Rock Corral Butte in the southeastern corner of the map, and others from rift-controlled vents trending about N. 45° W. in the area of Quaking Aspen Butte, Fingers Butte, Rattlesnake Butte, and Serviceberry Butte
- Qbc** BASALT LAVA FLOWS AND PYROCLASTIC DEPOSITS (UPPER TO MIDDLE PLEISTOCENE--ESTIMATED TO BE 100,000 TO 200,000 YEARS OLD)--Dark-gray to black, tube-fed pahoehoe lava flows and bedded, moderately oxidized scoria and cinders, covered locally by as much as several meters of loess and eolian sand
- Qbd** BASALT LAVA FLOWS AND PYROCLASTIC DEPOSITS (MIDDLE PLEISTOCENE--ESTIMATED TO BE 200,000 TO 300,000 YEARS OLD)--Light- to dark-gray, tube-fed pahoehoe basalt lava flows, veneered by loess and eolian sand as much as several meters thick occur in Huddles Hole. Lava cones of deeply weathered scoria and lava occur on the northern flank of Big Southern Butte
- Qra** RHYOLITE AND OBSIDIAN LAVA FLOWS AND FLOW BRECCIA (MIDDLE PLEISTOCENE--ABOUT 300,000 YEARS OLD)--Chiefly white rhyolite lava flows with granular texture and minor flow banding. Upper surfaces of flows locally capped by as much as several meters of black obsidian and flow breccia. Forms a lava dome in the western and southwestern part of Big Southern Butte
- Qrb** RHYOLITIC MEGABRECCIA (MIDDLE PLEISTOCENE--ABOUT 300,000 YEARS OLD)--Angular clasts ranging in size from large blocks (as much as 10 m in diameter) to sand-size grains of tan to lavender, laminated rhyolite lava flow rock in a matrix of tan, aphanitic rhyolite. May represent a breccia pipe or breccia formed on the surface of an expanding dome
- Qrc** BEDDED RHYOLITIC VENT BRECCIA, PUMICE TUFF AND AIR-FALL ASH (MIDDLE PLEISTOCENE--ABOUT 300,000 YEARS OLD)--Gray to tan to red deposits of interbedded vent breccia and tuffs consisting of pumice fragments and ash
- Qrd** BANDED RHYOLITE LAVA FLOWS AND RHYOLITIC FLOW BRECCIA (MIDDLE PLEISTOCENE--ABOUT 300,000 YEARS OLD)--Chiefly tan to lavender, flow laminated (1-10 mm thick) rhyolite lava flows which grade upward into white-granular rhyolite lava flows and rhyolitic flow breccia. Forms a lava dome in the eastern half of Big Southern Butte
- Qre** RHYOLITIC OBSIDIAN AND LAMINATED RHYOLITE--OBSIDIAN LAVA FLOWS (MIDDLE PLEISTOCENE--ABOUT 300,000 YEARS OLD)--Thin laminae (<10 mm) of devitrified, black spherulitic obsidian and thin laminae of tan rhyolite with interlayers of spherulitic obsidian. Occurs in a zone as much as 100 m wide at contact of rhyolite (Qrd) and basalt (Qbe)
- Qbe** BASALT LAVA FLOWS (MIDDLE TO LOWER PLEISTOCENE?)--Dark-gray to green basalt lava flows, strongly hydrothermally altered at the base. Thickness exceeds 1,000 m on the northern side of Big Southern Butte. It underlies a tilted fault block that was uplifted and tilted approximately 40 degrees to the NNE by the rise of a rhyolite dome (Qrd)
- Qbf** BASALTIC SCORIA, CINDERS, AND ASH (MIDDLE TO EARLY PLEISTOCENE?)--Dark-brown to reddish-brown, oxidized, interbedded deposits of scoria, cinders, and ash, about 30 m thick. Clasts include small (1-10 mm) fragments of green, iridescent basalt glass. Occurs in a bed intertongued in unit Qbe approximately 60 m above the exposed base of Qbe
- Qbg** FERROLATITE LAVA FLOWS AND RHYOLITE PYROCLASTIC DEPOSITS (MIDDLE PLEISTOCENE--ESTIMATED TO BE ABOUT 400,000 YEARS OLD)--Light-gray ferrolatite with bulbous, rough-textured flow surfaces surround Cedar Butte. Cedar Butte is a pyroclastic cone consisting of vent breccia with large (as much as several meters) angular blocks of obsidian, pumiceous rhyolite, and minor basalt in a fine-grained, red, oxidized, rhyolitic matrix. A K-Ar whole rock age on ferrolatite is >400,000 years (Table 1)
- Pzu** DOLOMITE, SILTSTONE, LIMESTONE, ARGILLITE (MISSISSIPPIAN AND DEVONIAN)--Sedimentary rocks attributed by Skipp to the Jefferson, McGowan Creek, Thru Forks, Middle Canyon, and Scott Peak Formations--undifferentiated (Betty Skipp, written commun., 1977)

Abbreviations used for facilities at the Idaho National Engineering Laboratory

- CFA--Central Facilities Area
EBR 1--Experimental Breeder Reactor 1
EOR--Experimental Organic Cooled Reactor
ICPP--Idaho Chemical Processing Plant
RWMC--Radioactive Waste Management Complex
SPERT--Special Power Excursion Reactor Test
TRA--Test Reactor Area

DESCRIPTION OF MAP SYMBOLS

- CONTACT**--Dashed where approximately located, particularly between bedrock units that are veneered by thin deposits of windblown sand and loess. Dash-dot contact separates basalt flow units emitted from the same vent. Letters Y and O are used to denote younger and older flow along contact
- FLOW LINE**--Linear flow features and lava tubes; arrow shows flow direction. Open circles on flow lines are locations of skylights in lava tubes
- LAVA CHANNEL**--Arrow shows direction of flow within lava channel
- LAVA POND**--Shows location of levees surrounding lava pond
- CRATER**--Outline of crater rim on volcanic vent, barbs point toward central depression. Barbs not shown on symbol for smaller craters; examples found in Rock Butte and North Robbers vent areas
- CONES**--Vent for small lava cones, cinder cones, and spatter cones
- SPATTER RAMPARTS**--Long, low ridges of spatter and lava flows emitted along a volcanic fissure
- ROOTLESS VENT**--Secondary source of lava not directly related to conduits that brought magma to the surface from deep magma reservoir; chiefly openings in lava tubes
- FAULT**--Ball and bar on downthrown block, dashed where approximately located. Number in circle refers to vertical displacement where measured, in meters
- FISSURE**--Fractures in rock; segments of fissures through which lava has been emitted are shown with crosshatching, width of opening generally greater than 1 m
- LINEAMENT**--Linear features recognized on aerial photographs, believed to be the surface expression of faults and fissures
- LOCATION OF RADIOMETRICALLY DATED ROCK**--Suffix to number indicates radiometric method: C, radiocarbon; KA, potassium-argon; F, fission track

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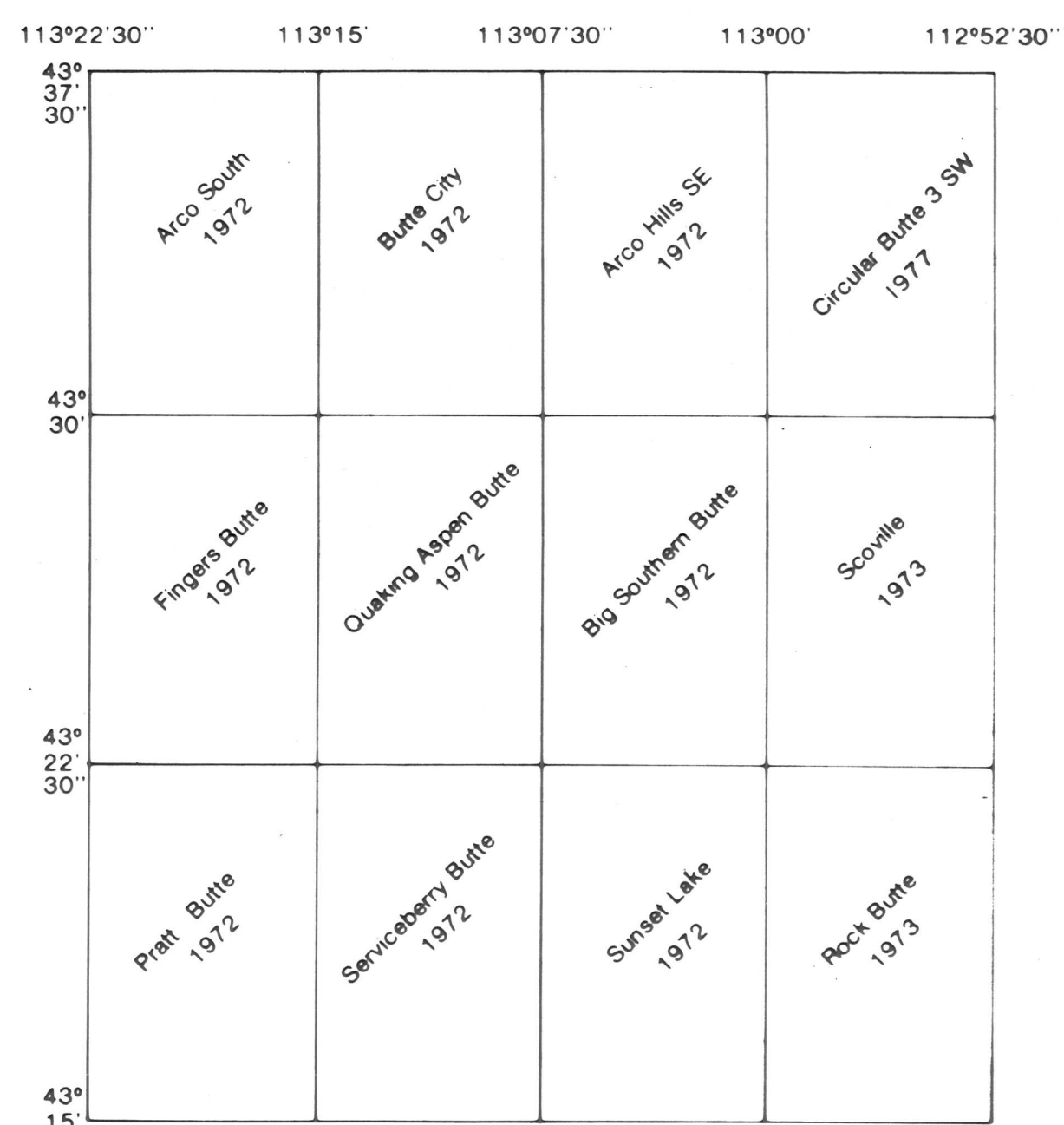
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Table 1--Radiometric ages of samples from the Arco-Big Southern Butte area, Idaho

Sample number	Location	Rock unit	Age	Method	Source
Ts899	Sec. 3, T. 2 S., R. 27 E.	Lava flows which emanated from the Great Rift in Craters of the Moon National Monument (Qba)	2,050±80 to 2,200±130 ¹⁴ C yrs*	¹⁴ C	Valastro and others (1972).
M-3673	NE1/4 sec. 16, T. 2 N., R. 30 E.	Cerro Grande lava flow (Qba)	10,780±300 ¹⁴ C yrs	¹⁴ C	Meyer Rubin (written commun., 1977).
M-3674	NE1/4 sec. 1, T. 2 N., R. 24 E., (25 km SW of Arco)	Sunset lava flow of the Craters of the Moon lava field (Qba)	11,120±300 ¹⁴ C yrs*	¹⁴ C	Valastro and others (1972).
M-3672	SW1/4 sec. 31, T. 1 N., R. 30 E.	North Robbers lava flow (Qba)	11,940±300 ¹⁴ C yrs	¹⁴ C	Meyer Rubin (written commun., 1977).
M-3918	NE1/4 sec. 10, T. 1 N., R. 28 E.	Lava flow of Quaking Aspen Butte (Qbb)	>40,000 ¹⁴ C yrs	¹⁴ C	Meyer Rubin (written commun., 1977).
	SW1/4 sec. 23, T. 1 N., R. 29 E.	Obsidian of Big Southern Butte (Qra)	0.26±0.05 m.y.	Fission-track	Glenn Isatt (written commun., 1977).
76G022	NE1/4 sec. 22, T. 1 N., R. 29 E.	Rhyolite (Qra)	0.296±0.015 m.y.	K-Ar whole-rock	C. B. Dalrymple (written commun., 1977).
70-38(1)	Big Southern Butte, exact location unknown	Rhyolite (Qra?)	0.30±0.02 m.y.	K-Ar whole-rock	Armstrong and others (1975).
76G021	SW1/4 sec. 23, T. 1 N., R. 29 E.	Obsidian of Big Southern Butte (Qra)	0.312±0.011 m.y.	K-Ar whole-rock	C. B. Dalrymple (written commun., 1977).
76G024	SE1/4 sec. 23, T. 1 N., R. 30 E.	Ferrolatite of Cedar Butte (Qbg)	>0.400±0.029 m.y.	K-Ar whole-rock	Armstrong and others (1975).

*These two ages date some of the youngest and oldest flows emitted from the Great Rift.



Index map for 7 1/2 minute topographic quadrangles covered by this map