GEOLOGY BY PETER W. LIPMAN AND DAVID A. SAWYER, 1986-1989
(In part modified from Steven and Ratté, 1965 and Steven and Lipman, 1973)

SCALE 1:50 000

CONTOUR INTERVAL 80 FEET
DATUM IS MEAN SEA LEVEL

FIGURE 2. GEOLOGIC MAP OF POST-COLLAPSE LAVA FLOWS AND ASSOCIATED ROCKS, OF THE SOUTH RIVER AND CREEDE CALDERAS, CENTRAL SAN JUAN MOUNTAINS, COLORADO

DESCRIPTION OF MAP UNITS:

POST-COLLAPSE LAVA FLOWS OF THE SOUTH RIVER AND CREEDE CALDERAS

Th **HINSDALE ? FORMATION**--Dark-gray lava flows of porphyritic andesite and dacite (58-63% SiO_2) containing plagioclase, hornblende, clinopyroxene, ± orthopyroxene, opaque oxides, and resorbed, xenocrystic quartz

ROCKS OF THE CREEDE CALDERA CYCLE

Tcd **CREEDE FORMATION** --Tuffaceous light-gray to yellowish-tan, ash-rich, volcaniclastic sedimentary rocks; widely zeolitized, deposited in the moat of the Creede caldera

Tpr **VOLCANICS OF POINT OF ROCKS** --Brecciated lava vent complex of light-gray, high-silica rhyolite (75% SiO_2) that is intrusive in its lower part. The rhyolite is flow-laminated and contains a few percent small phenocrysts of plagioclase, biotite, sanidine?, and trace amounts of quartz

FISHER QUARTZ LATITE --Coarsely to moderately porphyritic, light gray, dacitic lava flows, vent intrusions, and volcaniclastic rocks (generally 63%-67% SiO_2). Contain 15-30% phenocrysts of plagioclase, averaging 3.5 mm long, hornblende, biotite, ± pyroxene, ± sanidine (locally up to 4 cm and resorbed), opaque oxides, ± trace sphene, ± trace quartz. 26.9-26.7 Ma

Tf **Lava flows**--Massive gray dacite lava flows, locally with well-developed carapace breccias and lower vitrophyres. Individual lava flows up to several hundred meters thick

Tfm **Mudflows and other volcaniclastic rocks**--Contain heterolithic clasts of Fisher flows (Tf) up to several meters in diameter, in a light gray sandy matrix; poorly to moderately sorted; locally crudely to well-bedded

Tfi **Intrusive rocks**--Volcanic necks and dikes containing similar mineralogy to Fisher Quartz Latite lava flows

Ts **SNOWSHOE MOUNTAIN TUFF**--Red-brown to gray, dacite ash-flow tuff containing 35- 60% phenocrysts, mainly plagioclase, biotite, and augite. 26.9 Ma

ROCKS OF THE SOUTH RIVER CALDERA CYCLE

VOLCANIC ROCKS OF SOUTH RIVER PEAK--Lava flows, intrusions, and mudflow deposits of finely porphyritic andesite to mafic dacite (54-63% SiO_2). Broadly distinguished from Fisher Quartz Latite by darker color of flows, more mafic compositions, and smaller phenocrysts (plagioclase averages 2.5 mm). 27.2-26.3 Ma

Tsd **Mafic dacite lava flows**--Gray porphyritic dacite (61-63% SiO_2), containing plagioclase, hornblende, ± biotite, ± pyroxene, and opaque oxides

Tsh **Hornblende andesite lava flows**--Gray finely porphyritic andesite (59-62% SiO_2), containing plagioclase, hornblende, ± pyroxene, ± trace sphene, and opaque oxides

Tsa **Andesite lava flows**--Dark gray, finely porphritic andesite (56-61% SiO_2), containing clinopyroxene, ± orthopyroxene, ± hornblende, and opaque oxides

Tsm **Mudflows and other volcaniclastic rocks**--Light gray, crudely bedded volcaniclastic sedimentary rocks, dominantly containing clasts of South River flows; clasts of silicic dacite (Fisher-type) occur locally

Tsi **Intrusive rocks**--Intergrading aphanitic/porphyritic andesite, fine-grained diorite, and minor dacite (54-65% SiO_2), containing plagioclase.± (hornblende,biotite,pyroxene), ± trace quartz, and opaque oxides. Some intrusive rocks in headwaters of Red Mountain Creek are propylitically altered, and both intrusions and adjacent country rocks are widely pyritically altered and silicified

Tw **WASON PARK TUFF**-- Red, rhyolite ash-flow tuff containing approximately 30% phenocrysts of tabular feldspar, platy biotite, and sparse pyroxene; large white, collapsed pumice fragments with tridymite are characteristic. 27.2 Ma

ROCKS OF LAKE HUMPHREYS (?) CALDERA CYCLE

Ttm **VOLCANICS OF TABLE MOUNTAIN** -- Flows, mudflow deposits, and intrusions of porphyritic dacite and andesite (59-68% SiO_2), containing phenocrysts of plagioclase, hornblende (to 2 cm long), ± pyroxene, ± biotite, and opaque oxides. These rocks differ chemically from the younger intermediate-composition volcanic rocks (figure 4)

Tbc **TUFF OF BLUE CREEK**-- Brown, dacite ash-flow tuff containing 25-35% phenocrysts of plagioclase, biotite, augite, and opaque oxides. Absence of sanidine is diagnostic (27.3 Ma)

Taf **UNDIFFERENTIATED ASH FLOW-TUFFS AND INTERLEAVED LAVA FLOWS OF THE CENTRAL SAN JUAN CALDERA CLUSTER**-- Includes Wason Park Tuff (27.2 M; South River caldera); Tuff of Blue Creek (27.3 M; Lake Humphreys caldera); Carpenter Ridge Tuff (27.4 M; Bachelor caldera); and Fish Canyon Tuff (27.75 M; La Garita caldera)

Tcn **CONEJOS FORMATION**--Precaldera lava flows and volcaniclastic sedimentary rocks. Flows range from andesite to dacite in composition and contain plagioclase typically accompanied by augite; biotite is present in more silicic flows

Symbols Used For Sample Localities

--Hexagons: Hinsdale ? Formation
--Triangles: Fisher Quartz Latite
--Circles: Volcanic rocks of South River Peak
--Squares: Volcanic rocks of Table Mountain

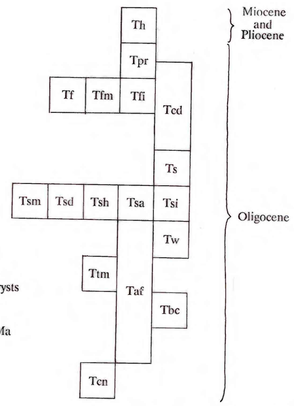
———— Contact

- - - - - - Inferred contact

Caldera topographic margin

Fault, bar and ball on down thrown side

Correlation of map units



Note: Age dates by Marvin Lanphere (unpublished data, 1990) indicate that two lavas cropping out high in the volcanics of South River peak may be younger than Fisher Quartz Latite age date samples north of the South River caldera.

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey standards and stratigraphic nomenclature.