DEPARTMENT OF INTERIOR
UNITED STATES GEOLOGICAL SURVEY

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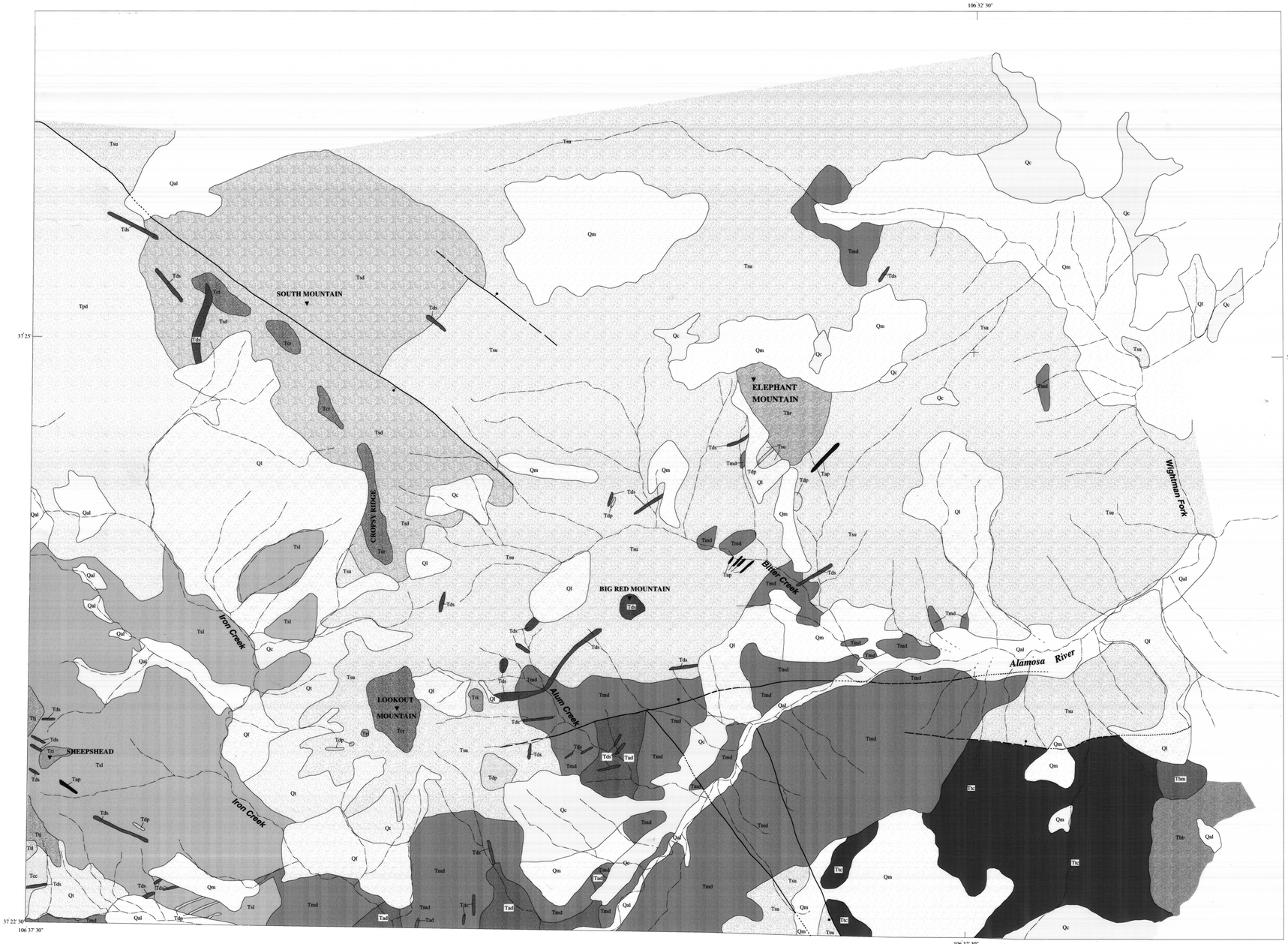
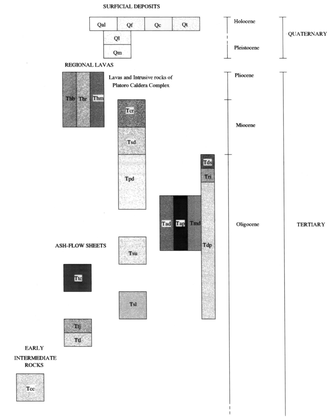
SHEET 1 OF 10





DESCRIPTION OF MAP UNITS
(modified after Lipman, 1974)

SURFICIAL DEPOSITS

Qal Alluvium (Holocene)--Sand, gravel and boulder deposits along valley bottoms. Locally includes alluvial fan and colluvial deposits at the mouths of tributary canyons.

Qf Alluvial-fan deposits (Holocene)--Poorly sorted material generally ranging from silt to boulders, locally consisting of mudflows

Qc Colluvium (Holocene)--Silt to boulder sized, poorly sorted material on slopes. Locally includes small alluvial-fan, talus, and glacial moraine deposits

Qt Talus (Holocene)--Anglular rock framents and small boulders up to 1m, forming talus cones, aprons, and scree slopes. Locally well sorted with increase in sand and silt content, grades into colluvium

Ql Landslide deposits (Holocene)--Poorly sorted matererial originating from bedrock and glacial deposits. Includes rock slide, block-slide, slump, and earthflow deposits.

Qm Glacial moraine (Pleistocene)--Poorly sorted deposits ranging from silt to boulders. Mostly lateral or terminal moraines with distinctive hummocky topography. In some areas difficult to differentiate from landslides containing glacial material

REGIONAL LAVAS

HINSDALE FORMATION (PLIOCENE AND MIOCENE)

Tbb Basalt lavas--Fine-grained silicic alkali basalt and basaltic andesite flows. Sparse small olivine phenocrysts are typical, and xenocrysts of quartz and feldspar are locally abundant. K/Ar ages of flows in the area range from about 23-16 Ma (Hon and Mehnert, 1983)

Thr Rhyolite --Light-gray to white domal vent complex rocks, generally containing sparse phenocrysts of sanidine, quartz, and biotite

Thm Mixed lavas--Vent-dome assemblage of heterogeneous comagmatic basalt and rhyolite, generally including dark-gray alkali-olivine basalt, gray andesite, and light-gray quartz-sanidine rhyolite that contains enclaves and irregular blebs of more mafic lava

ASH-FLOW SHEETS

ASH-FLOW TUFS OF THE TREASURE MOUNTAIN GROUP (OLIGOCENE)--Numerous ash-flow sheets erupted from the multicyclic Platoro caldera complex. Includes at least twenty separate ash flow sheets of dacite to low-silica rhyolite. The total volume of ash-flow volcanism exceeded 3,000 km3. Characteristic phenocrysts throughout include plagioclase, biotite, and augite, with sparse sanidine only in the Chaquito Peak tuff (Lipman and others, in press)

Tra Chaquito Peak tuff (Miocene)--Moderately to densely welded ash flow sheet, light-tan to gray tan in outflow and dark gray in intracaldera facies. Petrologically uniform crystal-rich dacite containing phenocrysts of plagioclase, biotite, augite, and sparse sanidine. Intracaldera tuff is propylitically and hydrothermally altered, and pumice and other pyroclastic textures are mostly obliterated. Previously mapped in the southeastern San Juan Mountains as the Masonic Park tuff (Steven and Lipman, 1973; Lipman, 1975a). Interpreted by Lipman and others (in press) as erupted from the Chaquito Peak caldera, source of the last erupted tuff from the revised Treasure Mountain Group (Lipman and others, in press). Equivalent to parts of the Masonic Park tuff (Tma of Lipman, 1974) and sanidine bearing La Jara Canyon tuff (Tj of Lipman, 1974). 40Ar/39Ar age of 28.4 Ma (Lipman and others (in press)

Trj La Jara Canyon tuff (Oligocene)--Non-welded to densely welded red-brown dacitic ash-flow sheet, containing 20-40 percent phenocrysts of plagioclase, biotite, and augite. Contains sparse to abundant angular red-brown andesitic lithic fragments a few centimeters in diameter. Tuff dips of 40-50 degrees on Prospect Mountain in the western part of the map area marks the preserved wall of the La Jara Canyon caldera (Lipman and others, in press). 40Ar/39Ar age of 29.3 Ma (Lipman and others, in press)

Trl Lower tuff (Oligocene)--Local nonwelded to densely welded ash-flow sheets of low silica rhyolite; mostly phenocryst poor (5-10 percent). Erupted from within the Platoro caldera complex, although any subsidence features related to emplacement concealed by younger deposits

LAVAS AND RELATED ROCKS OF THE PLATORO CALDERA COMPLEX

Lava units

Tcr Rhyolite of Cropsy Mountain (Miocene)--Flows and small plugs of coarsely porphyritic rhyolite containing 10-30 percent phenocrysts of quartz, plagioclase, sanidine, and sparse biotite and hornblende. Nearly identical compositionally to intrusions of rhyolite porphyry (Tri). K/Ar age of 20.2 Ma (Lipman, 1974). Equivalent to Tcq of Lipman (1974)

Tsd Dacite porphyry of South Mountain (Miocene)--Coarsely porphyritic dacitic lava dome, containing about 25 percent phenocrysts of quartz, plagioclase, sanidine, and sparse biotite and hornblende. Characterized by sanidine megacrysts as much as 5 cm across. The lava dome consists of at least four intragradational phases (Perkins and Nieman, 1983) that rest partly on the upper Summitville Andesite and partly on the dacite of Park Creek. Host rock of the Summitville ore deposit. 40Ar/39Ar age of 23.0 Ma (L. Snee, oral comm.)

Tpd Dacite of Park Creek (Oligocene)--Coarsely porphyritic light-gray dacite lavas and breccias containing 15-30 percent phenocrysts of plagioclase, biotite, augite, and locally sparse hornblende. Differentiated from the Summitville andesite by the presence of biotite and larger and more abundant plagioclase phenocrysts. 40Ar/39Ar age data (Lipman and others, in press) and geologic data (Lipman, 1975) constrain age between 26.7-26.2 Ma. Equivalent to Lipman's Rhyodacite of Park Creek (1974)

SUMMITVILLE ANDESITE (OLIGOCENE)

Tsu Upper member--Dark to medium gray aphanitic to sparsely porphyritic andesitic flows and breccias. Generally contains less than 10 percent phenocrysts of lath-to tabular shaped plagioclase, equant augite, and opaque oxides; biotite and hornblende are rare. Post dates emplacement of Chaquito Peak tuff

Tsl Lower member--Petrographically similar to upper member but stratigraphically below the Chaquito Peak tuff. Located on the western margin of the map area, where a scallop of the La Jara Canyon caldera and its intracaldern fill (La Jara Canyon tuff, unit Tj) are preserved from collapse of the Chaquito Peak caldera

Intrusive units (Oligocene)

Tds Sanidine dacite porphyry (Oligocene)--Coarsely porphritic light-gray intrusive rocks, containing 10 to 30 percent phenocrysts of plagioclase, biotite, hornblende, and quartz. Contains sanidine megacrysts a large as 2-3 cm across with thin oligoclase rims. Mostly occurs as dikes up to 200 m in diameter. Includes some low silica rhyolitic rocks. Dikes mostly post -date hydrothermal alteration although some dikes and the small intrusion centered on the peak east of Alum Creek are intensely altered. Fresh dike in Schinnel Flats area west of Lookout Mountain (not on map) has 40Ar/39Ar age of 26.2 Ma (Lipman and others, in press)

Tri Rhyolite porphyry (Oligocene)--Small plugs of coarsely porphyritic rhyolite. Nearly identical petrographically and chemically to the rhyolite of Cropsy Mountain (unit Tcr). Equivalent to Miocene (?) Quartz Latite Porphyry (Tqp) of Lipman (1974)

Tad Dacite Porphyry of Alum Creek (Oligocene)--Medium to dark gray porphyritic intrusion containing 25-40 percent phenocrysts of plagioclase, biotite, and augite in a finely phaneritic groundmass. Plagioclase phenocrysts are mostly tabular to lath-shaped ranging from 1-4mm across. Where exposed, intrusive contact with the Alamosa River stock is sharp and may be locally fault bounded. Cut by one or more sparsely phenocrytic intrusions of similar composition. Main intrusive body centered around Alum Creek focus of intense hydrothermally altered rock. Equivalent to Monzonite porphyry (Tmp) of Lipman (1974)

Tdp Dacite porphyry (Oligocene)--Gray coarsely porphyritic intrusive rocks, contains 30-40 percent phenocrysts of plagioclase, biotite, and sparse hornblende and augite. Plagioclase phenocrysts are mostly tabular and average 2-4 mm across. Resembles the dacite porlpyry of Alum Creek but includes hornblende in phenocryst assemblage. Equivalent to Rhyodacite porphyry of Lipman (1974)

Tap Andesite porphyry (Oligocene)--Dark-gray to gray-green slightly to coarsely porphyritic aphanitic intrusive rocks. Contain phenocrysts of plagioclase and in places augite, but no biotite.

Tmd Monzonodiorite (Oligocene)--Gray fine to medium-grained, equigranular to slightly porphyritic intrusive rocks, containing subequal plagioclase and orthoclase, quartz, augite, and biotite. As presently exposed, the collective body of monzonodiorite, which is referred to as the Alamosa River stock (Lipman, 1976), is about 7 km by 2.5 km and is aligned roughly northwest. Zones of hydrothermally altered rocks are intimately associated with northern half of this intrusive body. Equivalent to Monzonite (Tm) of Lipman (1974)

EARLY INTERMEDIATE ROCKS

CONEJOS FORMATION (OLIGOCENE)

Tcc Volcaniclastic facies--Mostly reworked conglomerates, sandstones, and mudflow breccias containing clasts of dark intermediate composition volcanic rocks

CONTACT

FAULT – Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side

GEOLOGIC MAP OF THE IRON, ALUM, AND BITTER CREEK AREAS, UPPER ALAMOSA RIVER, SOUTHWESTERN COLORADO

By Dana J. Bove, Thomas H. Barry, Anna B. Wilson, Jeffrey Kurtz, Ken Hon, and R. E. Van Loenen (modified from Lipman, 1974)

0 0.25 0.5
Kilometers

SCALE 1:12,000

1996

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American stratigraphic code.