DEPARTMENT OF THE INTERIOR
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Open-File Report

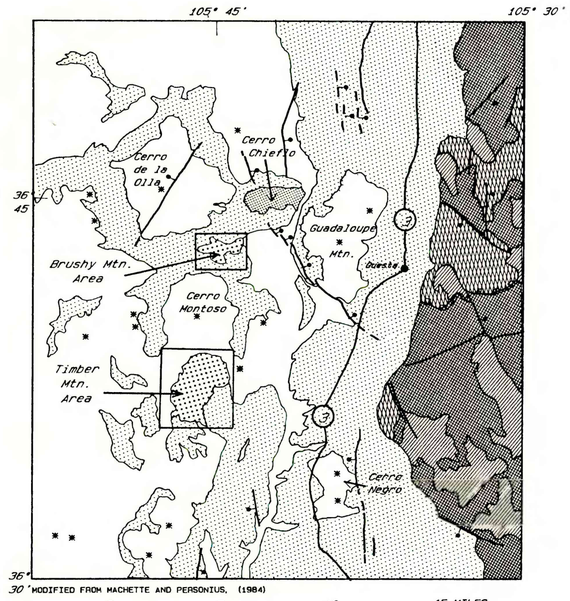
88-561

Introduction

Brushy Mountain and Timber Mountain are surface expressions of a major intrarift horst within the axial depression of the San Luis Valley part of the northern Rio Grande rift. Comprised entirely of upper Cenozoic volcanic rocks, these areas represent the western margin of the once-continuous Latir volcanic field centered near the Questa caldera 15 km east of Brushy Mountain. Development of a major rift basin, differential uplift and erosion on the margins of the present-day rift, and extensive Pliocene basaltic volcanism has left postcaldera rocks of the Latir field as detached exposures in horst blocks.

Age constraints on the volcanic sequence at Brushy Mountain are provided by K-Ar dating and the presence of a regional ash-flow tuff near the base of the section. The 26 Ma. Amalia Tuff (unit Tat) (Lipman and others, 1986) is overlain by younger volcanic rocks with a maximum age of 22 Ma., based on K-Ar ages from the Brushy Mountain rhyolite dome (unit Tr2).

The volcanic rocks at Timber Mountain are comprised of an older sequence (units Trl, Ttd, Tdl, Tdu, Tru, Tta) having a maximum age of 24-26 Ma. (Lipman and Mehnert, 1979) unconformably overlain by a younger sequence (units Thdl, Thdm, Thdu). The younger sequence has petrologic affinities to units Thdl and Thd2 of Brushy Mountain.



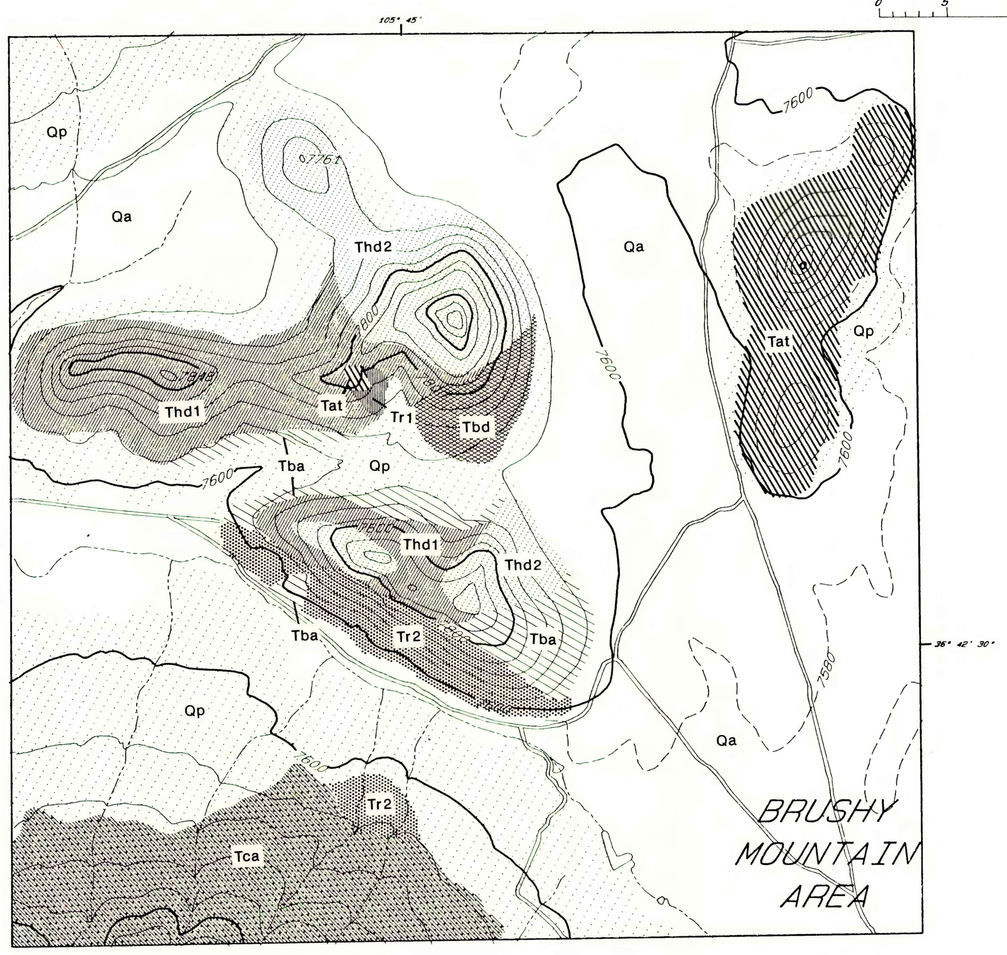
DESCRIPTION OF MAP UNITS

- SURFICIAL AND BASIN - FILL DEPOSITS
- PLEISTOCENE AND PLIOCENE VOLCANIC ROCKS
- CERRO CHIEFLO QUARTZ LATITE
- OLIGOCENE AND MIOCENE VOLCANIC ROCKS OF TIMBER MTN. AND BRUSHY MTN.
- GRANITIC AND RHYOLITIC INTRUSIVE ROCKS
- OLIGOCENE VOLCANIC ROCKS
- PROTEROZOIC ROCKS

ROCKS OF THE LATIR VOLCANIC FIELD

EXPLANATION

- CONTACT
- QUESTA CALDERA WALL
- FAULT; BAR AND BALL ON DOWNDROPPED SIDE; DASHED WHERE UNCERTAIN
- VOLCANIC CENTER



CORRELATION OF MAP UNITS

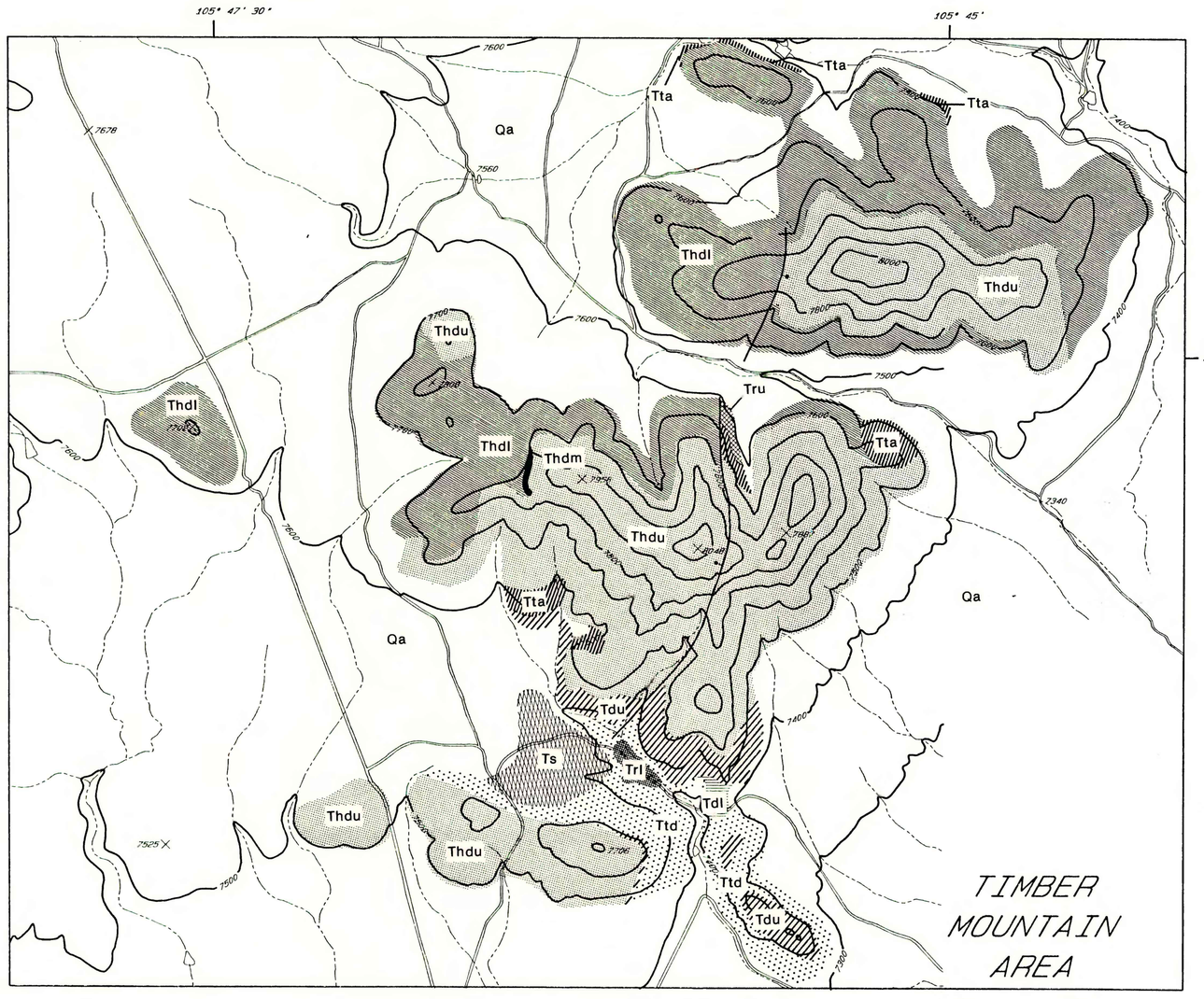
SURFICIAL DEPOSITS

Qa, Qp

REGIONAL LAVAS AND RELATED ROCKS

	BRUSHY MTN. AREA	TIMBER MTN. AREA
Holocene (?) and Pleistocene		Ts
Miocene	Tca; Thd2, Thd1; Tba, Tbd, Tr2	Thdu, Thdm, Thdl
Oligocene	Tat, Tr1	Tta, Tru; Tdu, Ttd, Tdl; Trl

Quaternary; Tertiary



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Machette, M.N., and Personius, S.F., 1984, Map of Quaternary and Pliocene faults in the eastern part of the Aztec 1 x 2 degree quadrange and the western part of the Raton 1 x 2 degree quadrangle, northern New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map, MF-1465-B, scale 1:250,000.

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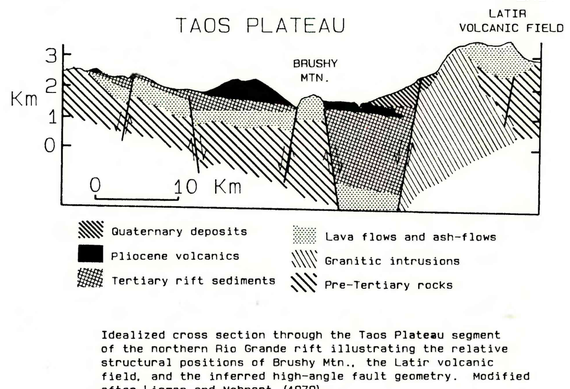
WEST — EAST



Idealized cross section through the Taos Plateau segment of the northern Rio Grande rift illustrating the relative structural positions of Brushy Mtn., the Latir volcanic field, and the inferred high-angle fault geometry. Modified after Lipman and Mehnert (1979).

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qa Undifferentiated alluvium (Holocene?)--Includes alluvium of active stream channels and of adjacent flood plains, some young piedmont-slope alluvium in low positions in valleys, and all alluvial deposits adjacent to Timber Mountain (unit Qp not mapped at Timber Mountain)

Qp Undivided piedmont-slope alluvium (Quaternary)--Includes young and old alluvium and colluvium that form broad, moderately dissected to smooth surfaces. Surfaces grade to low positions in valleys between hills of Brushy Mountain area

REGIONAL LAVAS AND RELATED ROCKS

BRUSHY MOUNTAIN AREA

Tca Andesite of Cerro Montoso (Pliocene)--Black to dark-brown porphyritic lava flows from vents on Cerro Montoso. Abundant phenocrysts of olivine in a groundmass of plagioclase, olivine, and augite

Thd2 Upper hornblende dacite (Miocene)--Gray to dark-gray, moderately porphyritic dacite flows and flow breccias containing hornblende, plagioclase, clinopyroxene, Fe-Ti oxides, minor orthopyroxene, sanidine, sphene, and traces of zircon

Thd Aphyric dacite (Miocene)--Dark-gray to black dacite, found mostly as float. Where exposed, forms monolithologic flow breccia containing vesicular, angular clasts

Tba Andesite (Miocene)--Medium- to dark-brown, porphyritic flows and flow remnants containing olivine, clinopyroxene, and plagioclase phenocrysts, plagioclase glomerocrysts, and minor orthopyroxene microphenocrysts in a fine- to medium-grained trachytic groundmass composed of plagioclase, clinopyroxene, and Fe-Ti oxides

Tr2 Rhyolite of Brushy Mountain (Miocene)--Light-gray to white rhyolite containing sanidine, quartz, and minor biotite phenocrysts in a devitrified glass matrix. K-Ar dating of sanidine yielded an age of 22.3±0.8 Ma (Lipman and Mehnert, 1979). Forms dome in center of map area

Tat Amalia Tuff (Oligocene)--Light-gray to light-brown, moderately to highly welded, porphyritic, rhyolite ash-flow tuff from the Questa caldera 15 km to the east. Consists of quartz and sanidine phenocrysts in a devitrified matrix; Fe-Ti oxides, sphene, and alkali amphibole are minor

Tr1 Rhyolite tuff (Oligocene)--Light-tan, poorly welded, lithic rich, ash-flow tuff. Contains phenocrysts of plagioclase and altered biotite, yellow altered pumice, angular vitrophyric inclusions (<0.5 cm to several cm) containing plagioclase phenocrysts, and reddish-brown dacite inclusions (2 cm to several cm)

TIMBER MOUNTAIN AREA

Ts Servilleta Formation (Pliocene)--Thin flows of dark-gray to black tholeiitic basalt characterized by small olivine phenocrysts, diktytaxitic texture, and local vesicle pipes and segregation veins

Thdu Upper hornblende dacite (Miocene)--Gray to brown porphyritic flows and flow breccias containing hornblende, plagioclase, clinopyroxene, Fe-Ti oxides, minor orthopyroxene, sanidine, sphene, and traces of zircon. Distinguished from unit Thdl by lower modal hornblende (<3%) and phenocryst abundance and by the presence of oxide-rimmed sphene

Thdm Middle hornblende dacite (Miocene)--Medium-gray, glassy lava flow or dome remnants, porphyritic containing hornblende, biotite, plagioclase, clinopyroxene, Fe-Ti oxide phenocrysts. Exposed locally on west side of Timber Mountain

Thdl Lower hornblende dacite (Miocene)--Medium- to light-gray, porphyritic flows and flow breccias containing hornblende (up to 8 percent), plagioclase, clinopyroxene, Fe-Ti oxides; minor orthopyroxene, sanidine, sphene, and zircon

Tta Andesite (Oligocene)--Medium- to dark-brown, porphyritic flow remnants containing olivine, clinopyroxene, and plagioclase phenocrysts, plagioclase glomerocrysts, and minor orthopyroxene microphenocrysts in a fine- to medium-grained trachytic groundmass composed of plagioclase, clinopyroxene, and Fe-Ti oxides

Tru Upper rhyolite (Oligocene)--Thin, glassy porphyritic lava flow containing plagioclase clinopyroxene, Fe-Ti oxides, biotite, and minor hornblende phenocrysts

Tdu Upper pyroxene dacite (Oligocene)--Devitrified spatter agglutinate, flow breccias, and thin lava flows, compositionally and mineralogically identical to unit Tdl

Tdl Lower pyroxene dacite (Oligocene)--Glassy spatter agglutinate. Part of deeply dissected spatter cone; primary dips indicate vent was probably east of present exposures. Contains plagioclase, clinopyroxene, orthopyroxene, Fe-Ti oxide, and minor hornblende phenocrysts, oligoclase and sanidine xenocrysts, quenched mafic microplilows, and sparsely porphyritic dacite xenoliths (as much as 10 cm)

Ttd Undivided pyroxene dacite (Oligocene)--Lava flows and flow breccias, many with vitrophyre bases and devitrified tops. Moderately porphyritic having plagioclase, clinopyroxene, orthopyroxene, Fe-Ti oxide phenocrysts in a glassy to fine-grained matrix

Trl Lower rhyolite tuff (Oligocene)--Light-brown, lithic-poor, highly welded ash-flow tuff. Contains moderately to highly flattened pumices, phenocrysts of plagioclase, sanidine, quartz, and biotite; subordinate amounts of Fe-Ti oxides, clinopyroxene and orthopyroxene in a glassy to partially devitrified matrix. K-Ar dating of biotite and sanidine separates yielded ages of 26.5±1.3 and 24.4±0.9 Ma, respectively (Lipman and Mehnert, 1979)

GENERALIZED GEOLOGIC MAPS OF THE BRUSHY MOUNTAIN AND TIMBER MOUNTAIN AREAS, TAOS COUNTY, NEW MEXICO

by

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