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A digital geologic map and explanation of the Los Pinos quadrangle, Rio Arriba and Taos Counties, New Mexico and Conejos County, Colorado

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INTRODUCTION

This dataset comprises a GSMAP version 8 coverage (Selner and Taylor, 1992) for a digital geologic map of the Los Pinos quadrangle, Rio Arriba and Taos Counties, New Mexico and Conejos County, Colorado. Digital data were obtained from 1:24,000 scale, stable-base author-compilation by point-mode digitizing. Contacts, faults and geologic features were digitized as linear topologic entities; no polygons are defined in this dataset. The map is based on a polyconic projection. Map units are labeled and map symbology is included.

The dataset is distributed on an IBM compatible, 5.25 inch, 1.2 megabyte format diskette. The following files are included with this dataset and are required for proper execution under version 8 of GSMAP:

LABELS.DAT
LOSPINOS.PLT
LOSPINOS.LSF
LOSPINOS.NDX
LOSPINOS.PRJ

Additionally, the file LOSPINOS.PPP contains an HPGL (Hewlett-Packard Graphics Language) plot file of the geologic map which can drive a Hewlett Packard 7585 compatible, large format pen-plotter or any other output device that is compatible with HP 7585-series equipment.

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

[Surficial deposits are generally more than 2 m thick where mapped, but thinner deposits are mapped in some locations to show their areal distribution and stratigraphic relations. The distributions of active stream-channel and flood-plain alluvium are delineated from aerial photographs with the aid of a Kern PG-2 stereoplotter; their mutual contacts are generally gradational and approximately located. The two units are only distinguished in the Rio San Antonio drainage. Age estimates and correlations are based on preservation of original surface morphology and the height of the alluvial depositional surface]

Qa **Active-stream channel alluvium (Holocene)** -- Silt, sand, pebble and cobble gravel, and peat-bearing deposits in valley bottoms along active stream channels. Locally includes small alluvial-fan deposits and colluvium at margins of valley bottoms. Depositional surface typically less than 1 m above present stream level. Not mapped along minor streams. Thickness unknown, but probably 1-8 m; base not exposed

Qfp **Flood-plain alluvium (Holocene)** -- Moderately well sorted, sandy and silty overbank alluvium and underlying well-sorted sandy pebble to cobble gravel. Forms extensive, slightly undulating, flood plains along the Rio de Los Pinos. Depositional surface typically 1 to 3 meters above present stream level. Thickness unknown, but may be as much as 8 m

Qafp **Undifferentiated alluvium (Holocene)** -- Includes alluvium of active stream channels (Qa) and of adjacent flood plains (Qfp) where the two units interfinger extensively.

Qc **Colluvium (Holocene and Pleistocene)** -- Poorly sorted detritus on the slopes of San Antonio Mountain, size ranges from silt to boulders. Locally includes small alluvial-fan and talus deposits. Thickness probably 1-5 m

BEDROCK

Regional lavas and related rocks

[Bedrock consists entirely of Tertiary mafic and intermediate volcanic rocks and basin-fill volcaniclastic sedimentary units that were deposited during extension in the San Luis basin and uplift of its western flank. The map area comprises part of the western boundary of the San Luis basin, a shallow dip slope of eastward-tilted volcanic and sedimentary rocks of the southern San Juan and Tusas Mountains. The Oligocene and Miocene units exposed in the map area largely project beneath the Pliocene and younger valley fill of the San Luis basin and the Pliocene volcanic cover of the Taos Plateau volcanic field. Volcanic rock names conform to the IUGS classification system (Le Bas and others, 1986) but the associated modifiers have been omitted for brevity. Formation subunit names are based more on compositional and petrographic characteristics than geographic association: thus, the map symbol for mildly alkaline basalts of the Hinsdale Formation is Thb; whereas Tht corresponds to tholeiitic basalts, and Thx corresponds to conspicuously xenocrystic subunits. Ages for volcanic rocks are based on potassium-argon (K-Ar) whole-rock determinations. Unpublished age determinations by H.H. Mehnert, and others cited, have been calculated using the IUGS decay constants (Steiger and Jager, 1977). Contacts that border the adjacent geologic map to the west (Manley, 1982) show some disagreement according to assignment of basaltic rocks to formations and to actual location of contacts between volcanic rocks and underlying volcaniclastic sediments. All contacts for this map were transferred from rectified, stereo, aerial photographs (approximately 1:21,000 scale) using a Kern PG-2 stereoplotter.]

Td **Dacite of San Antonio Mountain (Pliocene)** -- Dark-gray, aphyric to weakly porphyritic, tabular dacite flows (62-63 percent SiO_2) that comprise a steep-sided monolithologic shield volcano superimposed on an andesite shield volcano (Ta). Phenocrysts, generally less than 1-3 percent, are predominantly clinopyroxene, but locally include traces of orthopyroxene and olivine. Plagioclase phenocrysts are notably abundant (up to 10 percent) in flows near summit of San Antonio Mountain. Age determined to be 3.12 ± 0.17 whole-rock K-Ar age from flow on northeast flank of volcano (Lipman and Mehnert, 1979). Thickness unknown, base not exposed

Ta **Andesite flows (Pliocene)** -- Medium dark-gray, weakly porphyritic, platey andesite lava flows (56-57 percent SiO_2) containing 1-3 percent phenocrysts of olivine and pyroxene. Occurs as erosional remnants of an andesite shield volcano on the north flanks of San Antonio Mountain in the southeastern part of the map area and in the adjacent Pinabetoso Peaks 7.5 minute quadrangle east of the map area. Thickness 0-150 m

Ts **Servilleta Basalt (Pliocene)** -- Thin dark-gray pahoehoe flows of diktytaxitic olivine tholeiite (49-52 percent SiO_2) characterized by small olivine phenocrysts, and local vesicle pipes and vesicle segregation veins. Dominant basalt type of the Taos Plateau volcanic field (Dungan and others, 1984). Potassium-argon ages of flows east of the map area range between 3.6 and 4.5 Ma (Ozima and others, 1967; Lipman and Mehnert, 1979; Lipman and others, 1986) ; older ages correspond to the base of the exposed Servilleta section in the Rio Grande gorge 40 km southeast of the map area. Thickness 0-200 m

Hinsdale Formation (Oligocene to Pliocene) -- Dark-gray basaltic lava flows, flow breccia and near vent pyroclastic deposits. Includes basalt, basaltic andesite and andesite (49-59 percent SiO_2). As proposed by Lipman and Mehnert (1975), the Hinsdale Formation includes all basaltic rocks interlayered with volcaniclastic rocks of the Los Pinos Formation as well as those lavas overlying the Los Pinos Formation and pre-dating the voluminous outpouring of tholeittic Servilleta Basalt that underlies the Taos Plateau immediately to the east of the map area. Potassium-argon ages of east-dipping Hinsdale Formation lava flows that extend into the map area from the west have been dated at 24.6±1.8 Ma, and lava flows from the volcano at Chino Peak in the map area yielded a whole-rock K-Ar age of 3.9±0.4 (H.H. Mehnert, unpub. data, 1992). As regionally mapped, the Hinsdale Formation includes mafic lavas as old as 27.5 Ma to the north and northwest in the San Juan Mountains (Lipman and others, 1970; Lipman and Mehnert, 1975) and to the northeast in the San Luis Hills (Thompson and others, 1991)

Xenocrystic basalt to andesite -- Dark-gray flows comprising ridge crests in northwestern part of map area. Flows south of Rio de Los Pinos erupted from vent at Chino Peak in western part of map area. Two additional vents occur 3 km northwest of Chino Peak and are the source areas for flows north of the Rio de Los Pinos

Thxc **Cinder deposits** -- Predominantly cinder and spatter agglutinate, minor flow material, marks vent area for cone at Chino Peak in western part of map area

Thx **Flows** -- Massive flows on flanks of small shield volcanoes; overlying Los Pinos Formation sedimentary deposits. Chino Peak flows (49-50 percent SiO_2) contain up to 7 percent euhedral olivine phenocrysts, minor Fe-Ti oxides, and sparse plagioclase and quartz xenocrysts. North of the Rio de los Pinos, flows (51-54 percent SiO_2) contain phenocrysts of olivine (<2 percent), plagioclase (1-3 percent) and clinopyroxene (1-2 percent); resorbed sodic plagioclase xenocrysts are abundant. Age 3.9 ± 0.4 Ma (H.H. Mehnert, unpub. data, 1992). Thickness 0-100 m

Tht **Basalt of Rio de los Pinos** -- Four to five thin flows of dark-gray tholeiitic basalt (49 percent SiO_2) characterized by small olivine phenocrysts, diktytaxitic texture, and locally vesicle pipes and vesicle segregation veins. Whole-rock K-Ar age of 15.3 ± 0.8 (Lipman and Mehnert, 1975) . Unit occurs only in the Rio de Los Pinos drainage interbedded with Los Pinos Formation sedimentary deposits. Thickness 0-30 m

Thb **Basalt and basaltic andesite** -- Mildly alkalic lava flows (49-54 percent SiO_2), typically 3-5 m thick, preserved as isolated hill-capping outcrops above the Los Pinos Formation in western part of map area and a more extensive continuous deposit north of the Rio de Los Pinos. Age of flows in southwestern part of map area (Thb) is approximately 24.6±1.8 Ma based on a whole-rock, potassium-argon determination (H.H. Mehnert, unpub. data, 1992) from a flow near the base of a stratigraphically equivalent package of flows, 4 km west of the map area in the adjacent Bighorn Peak quadrangle. Phenocrysts of euhedral olivine are sparse(<5 percent), small, and partially altered to iddingsite. Groundmass is composed of andesine, augite, olivine and locally contains iron-titanium oxides. Thickness 0-40 m

Tlp **Los Pinos Formation (Oligocene to Pliocene)** -- Moderately well sorted bedded-conglomerates and poorly sorted sandstones. Clasts, subrounded to well rounded, consist predominantly of intermediate volcanic rocks derived from stratovolcanoes in the southeastern San Juan volcanic field and possibly the San Luis Hills in the central San Luis Valley. Largely equivalent to the Esquibel Member as mapped by Manley

(1982). Locally overlain by, and interbedded with, basalt and andesite flows of the Hinsdale Formation. Exposures in the Rio de Los Pinos drainage consist of a lower section of poorly sorted pebble to boulder conglomerate grading upward into alternating bedded sandstones and pebble conglomerates. Thickness 0-180 m

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Map Symbol Explanation

Contact -- dashed where approximately located

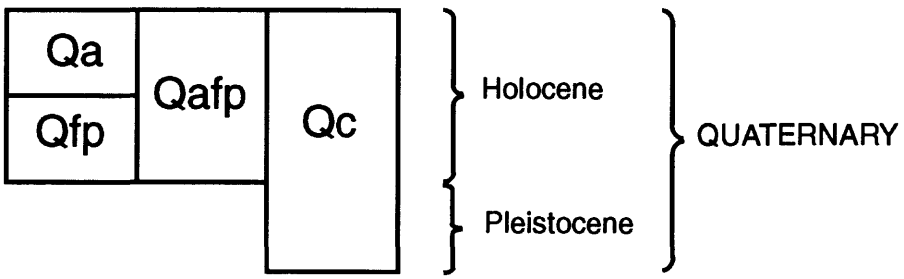
10 **Strike and dip of beds**

Collapse feature--Common in mafic lava flows of the Servilleta Formation and Hinsdale Formation

Interflow marker horizon--distinguishes prominant lava flow boundaries of major flow packages

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS



REGIONAL LAVAS AND RELATED ROCKS