DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MAP SHOWING OUTCROPS OF BASALTIC ROCKS,
BASIN AND RANGE PROVINCE AND VICINITY, TRANS-PECOS TEXAS

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INTRODUCTION

This map report is one of a series of geologic and hydrologic maps covering all or parts of the States within the Basin and Range province of the western United States, resulting from work under the U.S. Geological Survey's program for geologic and hydrologic evaluation of the Basin and Range province to identify potentially suitable regions for future study relative to isolation of high-level nuclear waste (Bedinger, Sargent, and Reed, 1984).

This map report on the basaltic rocks of Trans-Pecos Texas was prepared from published maps and reports and from field studies in progress by geologists of the Texas Bureau of Economic Geology, and was compiled utilizing the project guidelines of Sargent and Bedinger (1984). The map shows the outcrops and localities of measured thicknesses of the principal basaltic lava flows in the area. A few Precambrian basalts in the Allamoore Formation near Van Horn (King and Flawn, 1953) and the Mundy Breccia in the Franklin Mountains at El Paso (Harbour, 1972) are not shown on the map, as well as a few very thin basalts of limited distribution in various mountain ranges.

The basalts, as well as the other igneous rocks, of the Trans-Pecos area are alkalic (Barker, 1979), and most could more properly be termed hawaiite and mugearite. The basalts were extruded largely during the major period of volcanism in the Trans-Pecos area during the Oligocene from 38 to 28 million years ago (Henry and McDowell, 1982).

In the Description of Map Units, the general map location, geologic name, isotopic age, if available, a brief discussion, and the reference sources of each geologic map unit are discussed. The nomenclature of the geologic units is from published reports and does not necessarily conform to U.S. Geological Survey usage.
### DESCRIPTION OF MAP UNITS

(To convert meters (m) to feet, multiply by 3.281)

<table>
<thead>
<tr>
<th>Map symbol</th>
<th>Location: Map sheet and county</th>
<th>Geologic unit</th>
<th>Isotopic age in millions of years (m.y.)</th>
<th>Comments</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tr</td>
<td>Map sheet 2, Presidio and Brewster Counties</td>
<td>Rawls Formation</td>
<td>22 to 23, and 27 to 28 m.y. (McDowell, 1979)</td>
<td>Alkaline mafic to intermediate lava flows, and minor other types of rocks from complex stratovolcano; aggregate thickness 375 m.</td>
<td>Dietrich, 1965; Erickson, 1953; McDowell, 1979; McKnight, 1969</td>
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<tr>
<td>Tm4</td>
<td>Map sheet 2, Presidio County</td>
<td>Morita Ranch Formation, unit 4</td>
<td>32 to 35 m.y.</td>
<td>Many thin lava flows. Overlies an ash-flow tuff dated at 35 m.y.</td>
<td>Cepeda and Henry, 1983; Dietrich, 1965; Hardisty, 1982; Rix, 1953</td>
</tr>
<tr>
<td>Tm2</td>
<td>Map sheet 2, Presidio County</td>
<td>Morita Ranch Formation, unit 2</td>
<td>&gt;35 m.y.</td>
<td>Many thin lava flows. Underlies an ash-flow tuff dated at 35 m.y.</td>
<td>Cepeda and Henry, 1983; Dietrich, 1965; Rix, 1953</td>
</tr>
<tr>
<td>Tm1</td>
<td>Map sheet 2, Presidio County</td>
<td>Morita Ranch Formation, unit 1</td>
<td>&gt;35 m.y.</td>
<td>Several lava flows. Unit underlies ash-flow tuff dated at 35 m.y.</td>
<td>Cepeda and Henry, 1983; Dietrich, 1965; Rix, 1953</td>
</tr>
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<td>Tpe</td>
<td>Map sheet 1, Jeff Davis and Culberson Counties</td>
<td>Petan Trachyte</td>
<td>&lt;35 m.y.</td>
<td>The Petan is described as a dark-gray, vesicular, porphyritic, fine-grained, plagioclase trachyte in its type area (Amsbury, 1958), but was called a basalt on the various maps covering the Trans-Pecos area of the Geologic Atlas of Texas, (Barnes, 1979a, 1979b, 1982). Field observations by C. D. Henry, Texas Bureau of Economic Geology, indicate the distribution of the Petan of basaltic composition is much less than shown on those maps. On the southern flanks of the Davis Mountains the Petan probably include the Jones Formation (Anderson, 1968).</td>
<td>Amsbury, 1958; Anderson, 1968; Barnes, 1979a, 1979b, 1982</td>
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<tr>
<td>Code</td>
<td>Map Sheets</td>
<td>County Area</td>
<td>Formation, Member</td>
<td>Age (m.y.)</td>
<td>Description</td>
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<tr>
<td>Tbmb</td>
<td>2, Brewster and Presidio Counties</td>
<td>Chisos Formation, Bee Mountain Basalt Member</td>
<td>&gt;34 m.y.</td>
<td>Member consists of many thin lava flows in middle of Chisos Formation. Is older than the Mule Ear Tuff Member dated at 34 m.y.</td>
<td>Maxwell and others, 1967</td>
</tr>
<tr>
<td>Tsb</td>
<td>2, Brewster County</td>
<td>Chisos Formation, Ash Spring Basalt Member</td>
<td>&gt;34 m.y.</td>
<td>Composed of two or more lava flows in lower part of Chisos Formation.</td>
<td>Maxwell and others, 1967</td>
</tr>
<tr>
<td>Tacb</td>
<td>2, Brewster County</td>
<td>Chisos Formation, Alamo Creek Member</td>
<td>40 to 45 m.y. (Maxwell others, 1967)</td>
<td>Several lava flows in basal part of Chisos Formation.</td>
<td>Maxwell and others, 1967; Stewart, 1982</td>
</tr>
<tr>
<td>Te</td>
<td>2, Brewster County</td>
<td>Extrusive basalt of St. John (1966)</td>
<td>22 to 23 m.y. (F. W. McDowell, University of Texas, Austin, unpublished data)</td>
<td>Basalt composed of a lower dark-gray unit and a upper reddish-brown unit, both comprised of several lava flows. Occurs as isolated remnants in Basin and Range fault blocks. Maximum thickness about 137 m (Wilson, 1951).</td>
<td>St. John, 1966; Wilson, 1951</td>
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<tr>
<td>Tcb</td>
<td>1 and 2, Brewster, Jeff Davis, and Presidio Counties</td>
<td>Cottonwood Spring Basalt</td>
<td>36 to 38 m.y.</td>
<td>Several basalt flows.</td>
<td>Goldrich and Elms, 1949; McAnulty, 1955</td>
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<tr>
<td>Tps</td>
<td>1 and 2, Brewster County</td>
<td>Sheep Canyon Basalt</td>
<td>36 to 38 m.y.</td>
<td>Several lava flows which probably came from source in Alpine area.</td>
<td>Goldrich and Elms, 1949; McAnulty, 1955</td>
</tr>
</tbody>
</table>
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