

111°35'  
31°30'

109°15'  
31°30'

UNITED STATES GEOLOGICAL SURVEY

OPEN-FILE REPORT  
77-331  
TIN, N. SONORA, MEXICO  
PLATE 2 OF 2



MAP SHOWING DISTRIBUTION PATTERN OF Tn FROM SAMPLES OF THE NONMAGNETIC FRACTION OF HEAVY-MINERAL CONCENTRATES, NORTHERN SONORA, MEXICO

EXPLANATION

| Reported Value (ppm) (by emission spectroscopy) | Frequency Reported | Percent of Observations | Plotted Symbols |
|---|--------------------|-------------------------|-----------------|
| 10  | 330                | 62%                     | .....           |
| 20  | 37                 |                         | *               |
| 30  | 80                 |                         | *               |
| 50  | 27                 |                         | *               |
| 70  | 40                 |                         | *               |
| 100   | 29                 |                         | △               |
| 150   | 17                 |                         | △               |
| 200   | 8                  |                         | △               |
| 300   | 4                  |                         | △               |
| 500   | 1                  |                         | *               |
| 700   | 1                  |                         | *               |

\* = not detected; L = present but below determination limit (in parentheses).

In the fall of 1975 the first phase of a two-year regional geochemical survey was conducted in the northern half of a study area in northern Sonora, Mexico, by a team of scientists representing the U.S. Geological Survey and the Consejo de Recursos Minerales of Mexico. Stream-sediment samples were collected at 823 sites and panned concentrate samples were collected at 531 of these sites. The sampling plan called for a sample site at each tributary draining an outcrop area of 5 to 10 km<sup>2</sup> in order to give a sample density of one sample/10 km<sup>2</sup>; however, accessibility controlled actual spacing. Five-pound composite stream sediment samples were scooped across the stream channels and sieved to -80 mesh. Additional samples were collected and panned to obtain a heavy mineral concentrate. Following heavy liquid separation, the heavy minerals were separated into several fractions based on magnetic susceptibility. The fractions include those minerals susceptible (1) to hand magnet, (2) to less than 0.5 amps on a Frantz separator, and (3) to greater than 0.6 amps on the Frantz separator. These three magnetic fractions plus the stream-sediment samples were analyzed by emission spectroscopy for 30 elements and by atomic absorption and wet chemical methods for six or more elements. The results were entered into the computerized Rock Analysis Storage System (RASS) and data sets were analyzed by various statistical programs in the USGS STATPAC system to produce element distribution maps and tabular statistics. The range of concentration of each element was subdivided into three or four intervals for plotting by symbols as shown in the above table.



U.S. Geological Survey  
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This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards.

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1977

30°00'  
111°35'

30°00'  
109°15'