

MINERALS ABSTRACTS

tina contains one of the world's greatest accumulations of silicic ash-flow tuffs and andesitic stratovolcanoes, both of which are attractive targets for mineral deposits. The region is a major mineral province in which many deposits of copper, lead, zinc, antimony, bismuth, tin, tungsten, silver, and gold are older than the widespread volcanic rocks. Although the volcanic rocks generally represent postmineralization cover, they contain additional mineral deposits, including: (1) magnetite flows, lead-zinc-silver, copper, manganese, and sulfur on the flanks and tops of eroded volcanoes; (2) epithermal silver and gold associated with subvolcanic intrusions and thermal springs; (3) wood-tin in ash-flow tuffs and lava flows; and (4) supergene uranium in ash-flow tuffs. The volcanic rocks contain abundant water-soluble salts and are the chief sources of the widespread saline deposits of this region, which include major resources of lithium and boron.

Our ongoing studies show fundamental differences in the volcanic rocks of the central Andes, and indicate that recently discovered calderas and deeply eroded stratovolcanoes may contain buried mineral deposits. For example, the igneous rocks in the Bolivian tin province are distinctly different geochemically from those in the Chilean copper province. The Bolivian volcanic suites are dominantly quartz latites and low-silica rhyolites, whereas the Chilean suites are dominantly calc-alkaline dacites. The Bolivian rocks are higher in virtually all lithophilic elements and show a moderate to strong peraluminous trend culminating in a rare tin-rich two-mica tuff that may be the extrusive equivalent of a tin-bearing two-mica granite.

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Neogene-Quaternary Volcanism and Mineralization in Central Andes

The Neogene-Quaternary volcanic province in the central Andean region of southern Peru, western Bolivia, northern Chile, and northwestern Argen-