HYDROTHERMAL MINERALIZATION WITHIN THE BALCONES AND LULING FAULT ZONES OF TEXAS

S. Christopher Caran

ABSTRACT

Occurrences of precious and base metals, in anomalous concentrations, have been reported for more than one hundred years from sites within the Balcones and Luling fault zones. Recent field investigations supported by geochemical studies have corroborated some of these reports while casting others in doubt. Whole-rock and ground-water analyses confirm claims of cobalt, zinc, and lead mineralization, but reputed gold, silver, and mercury concentrations have not been substantiated. While some metals are present at high levels in selected samples, the mineralized fraction of the host rock is minute, and there is no evidence to encourage hopes for a viable resource.

The source of these metals is problematic. Throughout the region, Lower Cretaceous limestones serve as the hosts and mineralization is clearly secondary. Late Cretaceous igneous activity was extensive in this area including the vicinity of most sites of mineralization. However, none of the sites are directly associated with volcanic or intrusive bodies, and the bulk composition of these igneous rocks suggests that they would have been unsuitable as a source for these metals. Current evidence favors mineralization from hydrothermal fluids expelled, by compaction, from sedimentary basins nearby. Metallogeny has occurred along faults and joints which may have served as conduits for the mineralizing fluids. In addition, formation waters are actively mineralizing porous Cretaceous limestones at depth in major fault zones of South Texas; these limestones contain traces of secondary galena, sphalerite, fluorite, and strontianite, and the waters are high in the corresponding solutes. This modern analogue is the most suitable model for the known occurrences of mineralization.

---

1Publication authorized by the Director, Bureau of Economic Geology, The University of Texas at Austin.
2Bureau of Economic Geology, The University of Texas at Austin, Austin, Texas 78712