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Potential for Sulfide Mineral Deposits in Australian Waters

Timothy F McConachy
Commonwealth Scientific and Industrial Research Organisation (CSIRO), Division of Exploration and Mining

Since the first discovery at 21ºN on the East Pacific Rise in the late 1970s, the global inventory of sites where mineral deposits are actively forming at hydrothermal vents related to submarine volcanism (so called "black smokers") has expanded rapidly. Numerous examples along spreading ridges now extend to every major ocean basin and divergent plate margin on Earth. Equivalent activity is now also known in a number of island arcs and backarcs at convergent plate margins, particularly in the western and southwestern Pacific region, as for instance at PACMANUS in the Manus back arc of Papua New Guinea and Sunrise in the Izu-Bonin arc south of Japan. Not surprisingly, however, the submarine deposits themselves, mainly due to their high concentrations of gold, copper, zinc and silver are attracting commercial attention by exploration and mining companies. These submarine mineral deposits are no longer scientific curiosities but are potential new sources of metals in their own right.

Although no active spreading centres nor associated sulfide mineral deposits are presently known within Australia' s currently defined maritime boundaries, this does not mean that sulfide deposits are absent on or in Australia's seabed. Indeed, fossil island arcs like those near Norfolk Island in eastern Australian waters have potential to host submarine massive Cu-Zn-Au-Ag sulfide deposits. However, surveys utilising detailed swath bathymetric mapping, geophysical methods such as magnetics and resistivity, dredging and coring are required to test this hypothesis.

Conceptually, carbonate shelf environments off NW Australia also have potential to host Pb-Zn-Ag deposits, so called Mississippi Valley types, and surveys are similarly required to test this idea. Thus, at least two submarine geological environments on Australia's seafloor have the potential to host deposits of sulfide minerals and thereby increase Australia's future inventory of seabed mineral resources.