

## **THE ROLE OF MARINE SCIENTIFIC RESEARCH IN THE IDENTIFICATION OF SEAFLOOR MASSIVE SULPHIDES**

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Seafloor massive sulphide deposits (SMS) precipitate where hot metalliferous fluids associated with submarine volcanic activity vent at the seafloor and mix with cold seawater. They occur in two contrasted tectonic settings, mid-ocean spreading axes and nearby seamounts at divergent plate margins (mainly in the Area), and volcanic arcs and backarc basins associated with convergent plate margins (mainly in EEZ and territorial waters).

From the initial 1978 discovery until recently, most known SMS were found by Marine Scientific Research (MSR) organisations as an outcome of expeditions aimed at fundamental scientific outcomes. Some government MSR bodies or sister government-sponsored mineral agencies have indirectly or directly engaged in prospecting for strategic resources, and encouraged by passage in 2010 of the ISA *“Regulations on prospecting and exploration for polymetallic sulphides in the Area”* two national agencies have applied for exploration contracts. Private enterprise has also joined the search in EEZ and territorial waters where national mining laws apply, raising substantial capital and developing high-level technical capabilities. The need for security of tenure with expectation of exploiting discoveries on short time frames may discourage private enterprise from operating in the Area under ISA regulations.

In the Bismarck Sea of Papua New Guinea MSR discoveries using low-cost technology in the 1990's have led to establishment of a new mining industry (Nautilus Minerals). Success required entrepreneurial approaches, interagency cooperation, government encouragement, and favourable law. Such contributions by MSR should continue, but the emphasis could shift to predictive research on factors that govern size and grade of deposits.