



Flood basalt-related magmatism and mineralization in the Naturaliste Plateau? Preliminary findings from IODP Expedition 369

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Flood basalt provinces and their oceanic equivalents are often sites of ore-bearing layered intrusions and ferroan (A-type) granitoids. Sites of massive eruption, such as Large Igneous Provinces, can contribute to ore formation in hydrothermal systems possibly through: a) provision of energy source for hydrothermal circulation such as the development of iron-copper-gold (IOCG), volcanogenic massive sulfide, and other mineralizing system; b) contribution of metals and ligands to post-magmatic hydrothermal fluids through water-rock interaction; and c) formation of impermeable eruptive units that can act as barriers or reactive precipitation front during hydrothermal fluid flow. The International Ocean Discovery Program Expedition 369 drilled five sites at the Great Australian Bight, Mentelle Basin, and Naturaliste Plateau. These areas developed during the breakup among Antarctica, Australia, and India, the continents that once formed the eastern margin of Gondwana. Previous works have suggested that the initiation of the Kerguelen Large Igneous Province may have played a causal role for the breakup. Thus, one of the goals of the expedition is to find out the mechanism for the breakup and its association with the Kerguelen Plateau hotspot. The expedition successfully recovered volcanoclastic sediments and volcano-sedimentary sequences at U1513 the deepest site in the Naturaliste Plateau. An unexpected but interesting result of this expedition is the discovery of hydrothermal alteration and mineralization associated with the volcano-sedimentary sequence. Preliminary geochemical data show that the least altered basalts are mostly tholeiitic and similar to Bunbury basalts but the topmost flow unit is high-MgO basalt with high Ni and Cr and incompatible trace element composition similar to ocean island basalts, suggesting a primitive composition and possible affinity with Kerguelen Plateau basalts, respectively. Our preliminary findings will be presented based on shipboard descriptions and geochemical results.