

New Insights into Komatiite-Hosted Nickel-Sulphide Ore Genesis

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Nickel sulphide mineralisation is commonly located in structural embayments or troughs at the base of the thick basal komatiite lava flow at Kambalda, W.A. Sediment is commonly not present in the troughs indicating that sediment has been eroded from the ore environment. There is no tangible evidence of thermal erosion, but if komatiites were fast flowing, low-viscosity, highly turbulent, dense lava flows in proximal environments then they should have caused physical erosion of the substrate sediments before thermal erosion could have occurred.

Primary contact relations, geochemistry, and textural and vesicle distribution of komatiite lavas, especially the ubiquitous development of coherent or quench fragmented margins, and the lack of autobreccias, is consistent with most komatiites having been emplaced under laminar flow conditions. Even where localised erosional contacts exist, the tops of flows are coherent, indicating that perhaps only narrow initial flow lobes were turbulent, but then as the flows evolved, widened and thickened, laminar flow conditions developed. Implications for ore genesis will be discussed.