

## From Deposition to Diagenesis and Beyond – Tracing the Origins of Manganese-Lutites of the Kalahari Manganese Field

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The Kalahari Manganese Field (KMF) of the Northern Cape Province of South Africa is undoubtedly one of Africa's iconic ore deposits. Hosting about 74% of all known minable manganese ores globally, it is by a far margin the largest land-based Mn deposit. More than 90% of the resource can be described as mangano-lutite, e.g., a microcrystalline, finely laminated sedimentary rock typically marked by an abundance of mm-sized ovoids and containing between 30 and 40 wt. % Mn. Across the entire KMF, this mangano-lutite occurs in three well-defined symmetrical units that are intercalated and in gradational contact with Superior-type banded iron formations of the 2.42 Ga Hotazel Formation. The latter forms part of the virtually undeformed and unmetamorphosed volcano-sedimentary succession of the Postmasburg Group, Transvaal Supergroup. Despite the economic relevance of the mangano-lutites as the world's single-most important source of manganese, there is a striking lack of mineralogical and mineral paragenetic data available in the published literature. This contribution provides a summary of recent mineralogical and mineral paragenetic studies on mangano-lutites from the southern part of the main Kalahari deposit as well as the Avontuur deposits further to the North. The results do not only provide an unprecedented insight into the complex diagenetic evolution of the mangano-lutites, but also reveal surprising differences in mineral assemblages in different parts of the KMF. These differences are thought to be due to systematic lateral variations in physicochemical conditions of manganese and iron precipitation during the deposition of metalliferous muds in a shallow, complexly structured marginal marine basin just prior or at the onset to the Great Oxidation Event.