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## **New Understanding and Revitalisation of a Historical Legend: Okiep Copper District, Northern Cape, South Africa**

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The Okiep Copper District ("Okiep") is the oldest mining district in South Africa. 2.2 million tonnes at 14.2% Cu are reported to have been produced artisanally between 1850-1930, with an additional 120 million tonnes at 1.9% Cu produced industrially between 1940-2001 from some from 42 separate mines. Endowment modelling suggests that 2-3 million tonnes of copper metal remains. Early magnetic surveys in the '70s and '80s were successful in identifying and mapping the enigmatic bornite-magnetite(-chalcopyrite) ores, but Okiep has not seen the benefit of modern improved geophysical techniques and modelling software. New ideas and the application of new technology is revitalising this historic copper mining district which is far from being exhausted.

A revised Geodynamic Framework for the Namaqualand Metamorphic Belt looks to understand the source of punctuated base metal mineralisation over a 1,000-million-year period, and how Okiep fits into this framework. Modern analytical studies have begun to answer questions of fertility, sulphur source and sulphide saturation, and quantitative mineralogy which has challenges historical ideas and answers questions of timing of mineralisation and enrichment.

The first modern airborne EM and magnetic surveys over Okiep were flown in 2018-19, resulting in enhanced resolution of known and suspected mineralisation, whilst providing better regional context. 2024-2026 the first magnetotelluric surveys were conducted over the entire district to map the deep architectural plumbing to the known major deposits and to identify other mineralisation at depth.