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Mapping Under Cover: The Kalahari Copperbelt in Eastern Namibia

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A minerals-focused interpretation is presented of an extensive area of interest (AOI) in eastern Namibia, extending from Dordabis in the west eastwards to the Botswana border. The historically explored Kalahari Copperbelt (KCB), comprising strata of the Sinclair, Tsumis, Nosib, and Witvlei Groups, bounds the AOI in the west. Our interpretation focus extends eastwards and southwards, under the cover of Kalahari Group sediments. The following data sets were incorporated into this study: Geological Survey of Namibia (GSN) geological mapping; GSN aeromagnetic and radiometric data, flown at a 200-m line spacing; GSN gravity data; available water-borehole records, providing cover thickness and bedrock lithologies; all borrow pit lithologies; revisits of known outcrops; acquisition of helicopter-borne electromagnetic data over selected areas; soil sampling, air-core and diamond drilling.

Our integrated interpretation of these data sets has highlighted the following features:

i. In the east, a series of ENE-trending regional anticlines and synclines constituting the westward continuation of the KCB (from Botswana), comprising sequences of the following Groups: Nama, Witvlei, Nosib (Mamuno), Klein-Aub (D'Kar), and Eskadron/Doornpoort (Ngwako Pan) Formations of the Tsumis Group.
ii. A major change in KCB orientation in the western AOI sector, trending NNE, approximately west of Witvlei, associated with the late-Damaran Kudu-lineament swath.
iii. The AOI is bounded in the southwest by Sinclair Group (Kgwebe) volcano-clastics flanking the Autabib basement anticline. Our work has revealed a series of thrust-bound synclines and anticlines southeast of this, largely under cover, interpreted to have been controlled by early rifting and subsequent southeast-directed thrusting along the Autabib anticline margin. At least two of these units reveal prospective Tsumis Group sediments. Thrusted segments of Sinclair volcanics are also evident in sparse outcrop or shallow sub-outcrop.
iv. We conclude that the Tsumis Group is a likely proto-Damaran sequence, rather than part of the Meso-Neo-Proterozoic Sinclair Group