

PROVENANCE OF SKELETON COAST DUNE SANDS

by Marina Coetzee

The sand in the Skeleton Coast and Kunene Ergs were originally deposited over millennia by the Orange River and, to a lesser extent, by the Swakop River on the broad continental shelf, laid bare and dried out during periods of sea level regression, and subsequently transported onto land by wind. This is an ongoing process. Studies showed that sand derived from the Orange River is carried by strong swell-driven longshore currents more than 1,750 km to the northern Namibian and southern Angolan shores. This is the longest cell of littoral sand transport recorded on Earth. Long-distance sand contribution from the Orange River is dominant, but not exclusive. Studies of river, beach and dune petrography, mineralogy, geochemistry and geochronology indicate that more than 80 % of the Skeleton Coast's dune sands are supplied by the Orange River and most of the remainder by the Swakop River, namely sediments of eroded metamorphic and granitic rock of the Damara Orogen. The contributions from Etendeka lavas and other rivers draining the Damara Sequence are minor.

Sand and heavy minerals are moved onshore by strong, sustained wave action. Further sorting by size and density takes place, mainly on the upper part of the eulittoral zone (high tide wave zone; swash zone) (Van Gosen, et al., 2014). Strong winds remobilise the fine sands and heavy minerals to form dunes landwards of beaches. Selective removal of larger, low-density grains by wind leaves behind smaller, denser grains and thus progressive heavy-mineral enrichment of beach and dune sands (Komar, 2007).

Skeleton Coast dunes have less volcanic rock fragments, less pyroxene, and more staurolite, garnet, tourmaline and amphibole, than the Namib Erg.



Figure 1. The dark colours of magnetite and Ilmenite accentuate ripples in sand (*Marina Coetzee*)



Figure 2. Accumulations of garnet lend a reddish hue to dunes (*Alex Derr*)

SOURCES

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