

Namibia's varied geology encompasses rocks of Archaean to Phanerozoic age, thus covering more than 2600 million years of Earth history. About half of the country's surface area is bedrock exposure, while the remainder is covered by Cenozoic deposits of the Kalahari and Namib Deserts.

Highly deformed gneisses, amphibolites, diverse metasediments and associated intrusive rocks are exposed within several metamorphic inliers in the central and northern parts of the country, and represent the oldest rocks of Archaean to Palaeoproterozoic age (ca. 2600 to 1600 Ma) in Namibia. These include the volcanic Haib Subgroup and Vioolsdrif Granite Suite along the Orange River, the volcano-sedimentary Khoabendus and Rehoboth Groups, as well as the Kunene and Grootfontein Igneous Complexes in the north.

The Mesoproterozoic (1600 to 1000 Ma) is represented by the Namaqua Metamorphic Complex in the south, which comprises granitic gneisses, metasediments and felsic to mafic intrusions, and by the volcano-sedimentary Sinclair Supergroup of central Namibia, with its associated granites (e.g. Gamsberg Suite).

The coastal and intracontinental arms of the late Proterozoic Damara Orogen (ca. 800 to 500 Ma) underlie much of northwestern and central Namibia, with stable platform carbonates in the north, and diverse metasedimentary rocks pointing to more variable depositional conditions further south. The volcano-sedimentary Gariep Belt along the southwestern coast represents the southern extension of the Damara Orogen. Shallow-marine clastic sediments of the Nama Group, which covers parts of southern Namibia, are derived from orogenic uplift of the Damara and Gariep Belts.

Sedimentary and volcanic rocks of the Carboniferous to Jurassic Karoo Supergroup occur in the Aranos, Huab and Waterberg Basins, in the southeastern and northwestern parts of the country. They are extensively intruded by dolerite sills and dykes which, in collusion with predominantly basaltic volcanism (Etendeka Plateau) and a number of subvolcanic complexes (e.g. Spitzkoppe, Erongo), herald the break-up of the Gondwana Supercontinent, and the formation of the South Atlantic during the Cretaceous (ca. 130 Ma). The currently last chapter of Namibia's geological history is told by the widespread Palaeogene to Recent (< 50 Ma) sediments of the Namib and Kalahari Groups.

A great variety of mineral deposits has been identified throughout the stratigraphic column. Metamorphic complexes host several base and precious metal occurrences, such as copper-molybdenum porphyry, volcano-exhalative copper-lead-zinc and gold, volcanogenic copper, sedimentary-exhalative lead-zinc, shear-zone gold and beryllium-niobium-tantalum pegmatites. Meso- to Neoproterozoic rocks locally contain extensive red-bed copper, while calc-alkaline granitoid intrusives of that age have potential for porphyry and hydrothermal copper, as well as for vein-type gold mineralisation.

In the Neoproterozoic Damara Orogen and Gariep Belt, mineralisation is associated with successive phases of intracontinental rifting (copper, graphite), spreading and the formation of passive continental margins (volcano-exhalative base metals, e.g. Rosh Pinah {1}, Skorpion {2}); sedimentary-exhalative lead-zinc, e.g. Tsongoari {3}; glaciomarine iron-manganese, e.g. Otjosundu {4}; sediment-hosted copper, e.g. Klein Aub {5}). Besshi-type copper-pyrite (e.g. Otjihase {6}) is related to mid-ocean ridge development, whereas subsequent subduction led to the localised enrichment of carbonate-hosted base metals (e.g. Tsumeb {7}, Kombat {8}), uraniumiferous granites (Rössing {9}), rare metal and tin pegmatites (Uis {10}, Rubicon {11}), as well as skarn tungsten and gold (Navachab {12}, Otjikoto {13}).

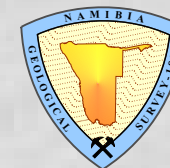
Coal measures are hosted in Palaeozoic rocks of the Karoo Supergroup, while Cretaceous anorogenic complexes, contain a variety of semi-precious stones, fluorite (Okorusu {14}), apatite, rare earth elements, iron and other base metals. Following the discovery of the offshore Kudu gas field of Cretaceous age {15}, hydrocarbon exploration also intersected oil-prone source rocks in boreholes. Cenozoic epigenetic uranium mineralisation occurs in calcretes above basement rocks in the Namib Desert (e.g. Langer Heinrich {16}), and salt is produced by solar seawater evaporation (e.g. Walvis Bay and Swakopmund Salt Works {17}).

The most important mineral resources of the country, however, are the Cenozoic diamondiferous beach and river gravels, which are exploited along the Orange River (e.g. Daberas {18}) as well as the southwestern coast, both offshore and onshore {19}. With mining techniques being developed to suit the unique conditions of these deposits, Namibia has become one of the world's top five producers of diamonds.

MINISTRY OF MINES & ENERGY



THE GEOLOGY OF NAMIBIA



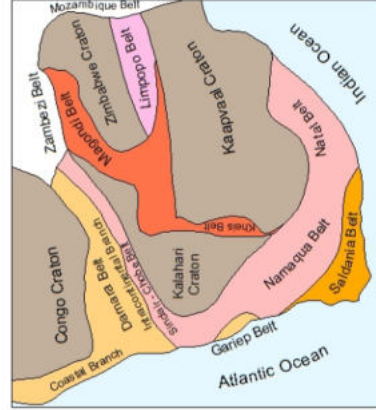
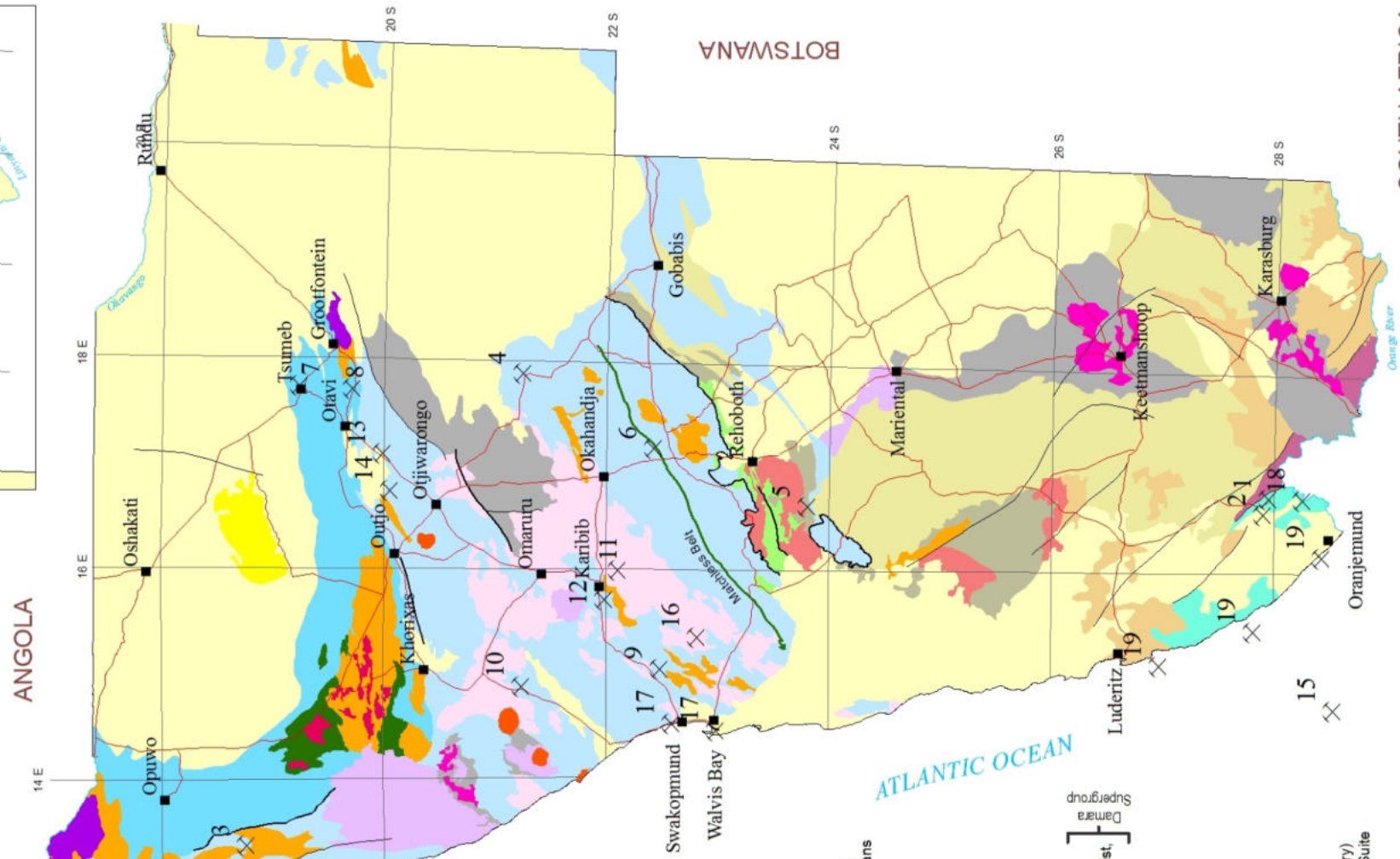
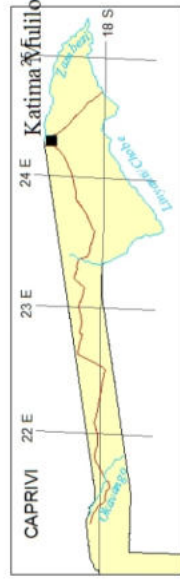
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SIMPLIFIED GEOLOGICAL MAP OF NAMIBIA



Palaeogene to recent	Young sediments of the Namib and Kalahari Sequences/salt pans
Cretaceous to Carboniferous	Late- to Post-Karoo dolerite/alkaline complexes
Cambrian 545-500 Ma	Karoo Supergroup (sedimentary/volcanic)
Namibian 1000-542 Ma	Nama Group (sedimentary)
	Damara granites
	Gariep Complex/ (volcano-sedimentary)
	Otavi lithologies (mainly carbonates)
	Swakop lithologies (mainly schist, with Matchless Amphibolite)
	Sinclair Supergroup (volcano-sedimentary)
	Namaqua Metamorphic Complex
	Gamsberg, Piksteel, Weener and Nubib Granites
	Fransfontein Granite Suite
	Rehoboth Group (volcano-sedimentary)
	Khaobendus Group & related formations (volcano-sedimentary)
	Haib Subgroup and Vrolijkheid Suite (volcanic/intrusive)
	Kunene and Grootfontein Complexes
	Metamorphic basement complexes
	Major fault/Thrust
	Producing, closed and projected mines

