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Late Pliocene vegetation and climate in Namibia (southern Africa)

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A pollen record from the southeast Atlantic (ODP Site 1082) registers vegetation development in southwest Africa during the Pliocene between 3.5 and 1.7 Ma. Four phases of vegetation development are inferred that are connected to global climate change. (1) Before 3 Ma, extensive rather open grass-rich savannahs with mopane trees existed in Namibia, but the extension of desert and semi-desert vegetation was restricted. (2) Increase of winter rainfall dependent Renosterveld-like vegetation occurred between 3.1 and 2.2 Ma connected to strong advection of polar waters along the Namibian coast and a northward shift of the Polar Front Zone in the Southern Ocean. (3) Climatically induced fluctuations became stronger between 2.7 and 2.2 Ma and semi-arid areas extended during glacial periods probably as the result of an increased pole-equator thermal gradient and consequently globally enhanced atmospheric circulation. (4) Aridification and climatic variability further increased after 2.2 Ma, when the Polar Front Zone migrated southwards and the influence of Atlantic moisture brought by the westerlies to southern Africa declined.