



Extending Terrestrial Climate Information Into the Marine Realm: Palynological Information as a key to Seismic Interpretation

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The sedimentary sequences of the continental margin off southwest Africa have been shaped by different forces: So, the interaction of climate, oceanic currents and sea level fluctuations left a significant imprint in the sedimentary structures along the continental margin. Additionally, tectonic movements affected the sedimentary sequences. Our aim is to unravel the development and modifications of the depositional system in the Northern Cape Basin, and to deduce from local processes to global paleoclimatological and paleoceanographic changes.

We present a seismostratigraphic model for the Neogene sedimentary layers in the Northern Cape Basin based on a combination of reflection seismic lines with drill site records of the ODP Leg 175 Site 1082, and assisted by palynological data. A striking observation is an unconformity dated at 2.2 Ma. The reflectors above onlap onto this interface, whereas the internal reflectors of the unit below show toplap termination. The outbuilding of the slope in the lower unit indicates a low relative sea level. In contrast the sigmoid reflection configuration in the unit above the unconformity is an indication for a gentle rise of relative sea level which indeed corresponds to a rise in eustatic sealevel. Since we can identify this Late Pliocene unconformity 250 km along the margin of the Northern Cape Basin we infer a large regional change in deposition regime. It coincides with a marked change of pollen assemblages. The accumulation rate of pollen suddenly drops from 50-60 pol/a/ccm in older layers to 8 pol/a/ccm in average after 2.2 Ma. The marked reduction of pollen input into the ocean is interpreted as the result of a loss of a perennial river discharge. It indicates a change of hinterland climate from humid to drier conditions, which in turn is associated with

a shift of the Polar Front Zone of the Southern Ocean in the late Pliocene.

An isopach map of the sedimentary thickness confirms a shift of deposition centers varying with times. Before late Pliocene deposition seems to be concentrated on the upper slope of the southwest African continental margin. In late Pliocene a strong decrease of thickness on the outermost shelf indicates the sea level regression, whereas in the middle Pliocene the thickness of layers increases moderately suggesting again the rise of sea level.