SOUTHEASTERN AFRICAN PALEOCLIMATE DURING THE PLIOCENE

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The lack of continuous, well-dated records of southeastern African climate that span the Pliocene has meant uncertainty about the impact of continental ice sheet variability and global gateway changes on the Agulhas Current and continental southeastern African climate. The Agulhas Current is a critical component of Southern Hemisphere tropical ocean circulation, moving warm, saline waters in the Mozambique Channel west of Madagascar and around southern Africa. Reaching the southern tip of Africa, this water is retroflected back to the east (known as the Agulhas Return Current), but a portion of this current escapes retroflection, making it into the Atlantic Ocean (Lutejeharms and Ballegooyen, 1988). Agulhas Leakage is thought to have a significant effect on global circulation, to a degree that likely varies through time (Knorr and Lohmann, 2003; Weijer et al., 2002; Weijer et al., 1999).

Here we present initial results of multiple organic geochemical proxies from sediments at two new sites in the source region of the Agulhas current off the southeastern coast of Africa, recovered by the 2016 International Ocean Discovery Program's Expedition 361 (Hall et al., 2016). Site U1474 in the northern Natal Valley (31°13.00'S, 31°32.71'E) and site U1478 east of the Limpopo River (25°49.26'S, 34°46.16'E) are used to examine oceanographic and terrestrial climate changes across the Pliocene. We reconstruct sea surface temperatures using the alkenone-based proxy for water temperature, $U^{k'}_{37}$, and compare to compound specific isotopes $\delta^{13}C$ and $\delta^{2}H$ of leaf wax compounds to examine the role of the Agulhas Current on the terrestrial climate of southeastern Africa.

References

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