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Deep circulation off South Africa: Northern vs Southern Hemisphere sources

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High resolution records of benthic foraminiferal (*C. wuellerstorfi*) stable isotopes, sortable silt mean grain size (SS) and fine lithic abundance (63-150 microns) have been established along IMAGES core MD96-2080 retrieved from the western Agulhas Bank Slope, South Africa (36 deg19.2´S, 19 deg 28.2´E, 2488 m water depth). The core is currently positioned within the southern extension of NADW upon its exit into the Indian Ocean. Benthic O18 displays orbital modulation that tracks global ice volume variations, while SS shows concomitant variations in the vigour of near-bottom current flow. Benthic C13 during the last glacial-interglacial cycle lacks distinct orbital periodicity suggesting alternation between water masses with similar isotope signature, for example C13-positive AAIW and NADW. Orbital modulation is seen in C13 during the previous climatic cycle suggesting a change in THC mode between the last and penultimate glacial period. Sub-millennial variability in the records is linked to climate variability documented in high-latitude marine and ice core records from the southern hemisphere. On orbital and suborbital timescales increased near-bottom flow speed, as indicated by increased SS, is linked with decreased benthic carbon isotope levels that are indicative of reduced deepwater ventilation. This demonstrates the significance of Southern Ocean THC in water mass formation and ventilating the southern hemisphere oceans. Atlantic-wide mid-depth C13 gradients on sub-millennial timescales support an interhemispheric significance of AAIW in that periods of enhanced northward AAIW advection are linked with convective instability in the N Atlantic. Abundance patterns of the fine lithic component appear to match IRD patterns in the open South Atlantic (47 deg S; Kanfoush et al., 2000) either sug-

gesting occurrence of iceberg drift in the Agulhas corridor during these periods, or possibly enhanced current sorting due to increased vigour of AAIW.