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Records of climatic change during the late Miocene: Preliminary results from atlantic sites ODP 925, 1088 and 982, using planktonic foraminifera fauna variability

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For the recent past (last 100 kyrs), changes in thermohaline circulation (THC) that drive, in part, the modern climate system are captured by records from ice cores and marine sediments. In particular, high-resolution planktonic foraminifera studies are widely and successfully used to reconstruct changing sea surface conditions such as equator to pole heat-transfer, ocean up-welling, and winter deep thermocline mixing intensity and inter-ocean water exchange.

The late Miocene is a time of ongoing Southern hemisphere glaciation in Antarctica, with associated Southern Ocean Sea Surface Temperature (SST) cooling impacting on the global climate through water formation at intermediate and deep level changes. In the Northern hemisphere, paleogeographic change affecting Pacific-Atlantic seaways, (closure of the Isthmus of Panama) is believed to have resulted in increasing northward heat transfer via the Gulf Stream, whereas regional tectonic events (e.g. associated with the Gibraltar Strait) affected water and salt exchange between the Mediterranean Sea and the Subtropical Atlantic. These may have impacted on the general oceanic circulation and global climate.

For the late Miocene (circa 5.5 Ma) high-resolution faunal data provide insights into heat transfer that will be helpful for climate modelling excises. Three high-quality ODP sites: Ceara Rise Site 925 from the warm western tropical Atlantic, Southern hemisphere Aghulas Site 1088 and North Atlantic Site 982 (50 N) have been investigated. The faunal responses to hydrographic changes during this interval are examined at species level and at the level of ecological faunal groups: Mixed-layer Dwellers,

Thermocline Dwellers, Deep Dwellers.

Preliminary results will be augmented by data from more ODP sites within the same time interval. Faunal analysis will be refined to allow inter comparison with geochemical and climate model outputs.