Heinrich-like Events in the Southeast Pacific: Abrupt Climate Change During the Last Interglacial

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Previous studies of orbital-scale climate changes and their impacts on the marine realm have been primarily focused on records from the Northern Hemisphere. While solar insolation at 65°N plays a primary role in pacing orbital changes, determining the mechanism(s) transferring climatic changes around the globe also requires records from the mid and high southern latitudes (Pahnke *et al*., 2003). Here we present such a record from ODP Leg 202, Site 1234 located ~ 65 km off the Chilean Margin (36°13.153′S, 73°40.902′W). With a high sedimentation rate of ~79 cm/kyr, the core provides the opportunity to examine Marine Isotope Stage 5 (MIS 5), the last interglacial, in high resolution. Using quantifications of Ice Rafted Debris (IRD), foraminiferal abundances, *N. pachyderma* (sinistral) abundance and oxygen isotopes from planktonic and benthic foraminifera, this study revealed an 80 kyr record of climate change. We resolved MIS 5 in sufficient detail to observe MIS boundary 5/6, sub-stages 5a through 5e and millennial-scale variability during the last interglacial.

Comparison of our records with previous records from the North Atlantic (Oppo *et al*., 2001) demonstrates that orbital-scale warming in the two hemispheres appears to be synchronous and it is not possible to infer an age relationship in an attempt to constrain a synchronization mechanism. However, comparison of our records with Mass Flux records, also from the North Atlantic (McManus *et al.,* 1998) shows that episodes of ice rafting at our site, associated with changes in foraminiferal abundances and oxygen isotope content, are similar and even correlated with Heinrich events in the North Atlantic. While previous studies have found widespread global responses to Heinrich events, this is the first record to show direct evidence of analogous events in the Southeast Pacific. The existence of these events, in phase with those in the North Atlantic, provides further constraints on the mechanisms forcing these abrupt climate oscillations. Based upon the location of our study site, phase relationships and observed sea level highstands during MIS 5 (Thompson and Goldstein, 2005) we propose that the most likely mechanism behind these events is the “Disintegration Model” as proposed by Hulbe *et al*., 2004. Additional work should seek to verify the identity of observed events as Heinrich analogues through refined age control, analysis of Pa/Th ratios and analysis of the fine fraction content in Site 1234.