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Deep sea ostracods from the subpolar North Atlantic (IODP Site U1314) during the last 300,000 years

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We present a high resolution 300 ky record of deep-sea ostracods from Integrated Ocean Drilling Program (IODP) Site U1314 in the subpolar North Atlantic. Site U1314 was cored by the scientific drillship *JOIDES Resolution* on the southern Gardar Drift during IODP Expedition 306 (Channell et al. 2010). The Gardar Drift is an elongated contourite deposited along the eastern flank of the Reykjanes Ridge. It is oriented NE–SW and extends for about 1100 km, increasing in water depth from ~1400 m in the NE to > 3000 m in the SW near the Charlie Gibbs Fracture Zone (Bianchi & McCave 2000). The drift deposit was formed by the interaction of Iceland Scotland Overflow Water (ISOW) and local topography (Bianchi & McCave 2000). At 2820 m water depth on the southern Gardar Drift, Site U1314 is influenced today by ISOW with a minor component of Lower Deep Water (LDW). During the last glacial period, the site was bathed mainly by LDW (Oppo & Lehman 1995; Hodell et al. 2009), which is sourced from the Southern Ocean as reflected by its high silica content (McCartney 1992).

The composite section of Site U1314 was sampled at a constant 10 cm spacing (samples are 20 cc in volume) from the core top down to 23 mcd, corresponding to Marine Isotope Stages (MIS) 1 through 8.5. In the absence of a benthic isotope ($\delta^{13}C$ and $\delta^{18}O$) record for Site U1314, we compare our ostracod data with paleoceanographic records from two other sites from the same drift deposit and a longer record from the central North Atlantic (Hall et al. 1998; Hodell et al. 2008, 2009).

Ostracods are generally well preserved. They range from rare (1–2 valves per sample) to abundant (maximum 218 valves per sample) and comprise more than 75 species. The most abundant genera are *Krithe* (dominant), *Rockallia*, *Cytheropteron*, *Henryhowella*, *Pennyella*, *Legitimocythere*, *Argilloecia*, *Echinocythereis* and *Pseudobosquetina* (Alvarez Zarikian 2009). Species diversity per sample varies from 1 to 21. We applied the ostracod dissolution index (ODI) (Passlow 1997), which classifies ostracod valve preservation according to physical appearance, from transparent (best) to white and chalky (poor), to determine the corrosiveness of bottom waters. The ODI provides useful environmental information, which can be indicative of glacial and interglacial oceanographic conditions and changes in the water masses flowing over the site, for example low nutrient (less corrosive) vs. high nutrient (more corrosive) waters.

Our results show that changes in ostracod diversity and abundance coincide with glacial/interglacial-scale deep-water circulation changes, which suggests that benthic meiofauna fluctuates synchronously with prevailing oceanographic conditions and food flux to the sediments (Alvarez Zarikian et al. 2009). Furthermore, the ostracod distribution revealed a link between ostracod taxa, deep ocean circulation and climatic stages. The genera *Krithe*, *Pennyella*, *Argilloecia*, *Ambocythere*, *Pelecocythere*, *Echinocythereis* and *Bradleya* are dominant during MIS 1, 3, 5c, 5e, 7.1, 7.3, 7.5 and 8.5, when the site was under the influence of North Atlantic Deep Water (NADW) (Bianchi & McCave 2000; Hodell et al. 2009). Conversely, *Rockallia* is nearly absent during full interglacial times and is very abundant during climate transitions. *Cytheropteron* is strongly associated with deglaciations, and species *Abyssocythere atlantica*, *Dutoitella suhmi* and *Bythocythere bathytatos* prevail during glacial intervals (Alvarez Zarikian et al. 2009) when the site was under the influence of LDW (Oppo & Lehman 1995; Hodell et al. 2009). This report of glacial/interglacial scale deep-sea ostracod faunal trends provides evidence and useful information for the application of deep-sea ostracods to paleoceanographic reconstructions (i.e., deep water circulation) and biodiversity studies.

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