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Quarternary record of carbonate preservation and paleocenographic changes from the Yermak Plateau (Hole 912A)

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The present ongoing study on samples from ODP Hole 912A (Yermak Plateau, water depth 1036 m) have been undertaken to provide detail insight of the paleoceanographic changes from this area over the last few glacial/interglacial cycles. The core is located within the marginal zone of the sea-ice cover in the Arctic, close to the northernmost extension of the West Spitsbergen Current and thus suitable for understanding the complex interaction of ice cover, sedimentation and water circulation. The study is based on planktonic and benthic foraminiferal assemblage and isotope stratigraphy and the amount of ice rafted debris (IRD). Amount of IRD provides supporting data especially in intervals having samples barren of foraminifers, to achieve a more accurate chronology.
The carbonate preservation was studied under scanning electron microscope (SEM) and binocular microscope on benthic (Cassidulina reniforme and Melonis barleeanus) and planktonic (Neogloboquadrina atlantica sin. and N. pachyderma sin.) foraminiferal tests. Four progressive stages of dissolution were distinguished ranging from tests unaffected by dissolution to strongly dissolved tests. A semi quantitative scale describing the preservation was established with 1 as the best preservation and 4 as the poorest preservation and 5 representing barren samples. Maximum carbonate dissolution peaks correlated well with peaks of ice-rafted debris (IRD). The relatively high content of coarse material in the core may also due to its location on the continental slope and the proximity to land. According to the present age scale status, the glacial stages contain more foraminifers than interglacials, with maximum foraminiferal abundance occurring between the IRD peaks.
The tests of some calcareous species are more resistant against dissolution than others which is linked to the microfabric of the shells (e.g. size, thin/thick wall, fine/coarse perforation and/or ornamented/unornamented species and specimens) leading to different degrees of preservation within the same environmental setting. Moreover, density of the tests is important for planktonic tests. Heavier tests sink faster to the bottom, thus minimizing the exposure time to potentially corrosive waters. This may also lead to discrepancies between the production and preservation of calcareous species. Several authors have related good carbonate preservation in the Arctic to intrusions and therefore the spatial expansion of Atlantic surface waters into the Arctic. Samples that are barren or have a poor preservation may represent episodes of deglaciations or interglacials with low carbonate production. Barren samples can also be an artifact of dissolution of shells and/or dilution by detrital material and IRD. Observed dissolution peaks may represent very strong, short term meltwater events.