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Holocene millennial scale variability in surface and deepwater records in the North Atlantic (ODP Site 980, Feni Drift)

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High quality climate records from Greenland ice cores and North Atlantic sediments reveal that Holocene climate was not as stable as previously thought; millennial-scale rapid climate oscillations that characterized the last glacial interval continued at lower amplitude into the Holocene. Oppo et al. (2003, Nature, 422) have shown major reductions in NADW production around 9,300, 8,000, 5,000, and 2,800 years before present. We present new evidence for such high frequency climate variability from ODP Site 980, NE Atlantic Ocean. Integrated high-resolution investigation of Holocene Feni Drift Site 980 sediments including grain-size, mineralogy, micropaleontology and bulk organic and isotope geochemistry have been carried out.

The records document the effects of variations in lateral advection on Holocene drift sediments and associated organic carbon burial. Complementary clay mineral records reveal fluctuations in supply of terrestrial matter from different source areas (Smectite as an indicator for the origin from N from Island/Faroer; Illite together with Chlorite as an indicator for the origin from E from England/Irland). The fluctuations in deep water circulation may have had a direct link to the surface waters as indicated by cyclic high frequency changes in the coccolithophorid assemblages. High resolution grain-size records from ODP Site 980 show distinct trends in the relationship between the clay and the silt fraction with highest clay contents in the early Holocene section. Superimposed we observe a series of high frequency variations in both the silt grain sizes and clay mineralogy. Our millennial scale variability in all parameters is not in phase to the “Oppo-Events”, but might be related to these.