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Deep Sea Corals Evidence Periodic Reduced Ventilation of the N. Atlantic During the LGM/Holocene Transition

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Numerical models predict fast and sharp changes of bottom water ages in the Atlantic triggered by increasing rates of fresh water discharge into the North Atlantic (Stocker & Wright, 1998). Their results demonstrate that ventilation changes can cause top-to-bottom age variations of 1,000 years in the Atlantic. However, changes in the Atlantic are sharp, so that high temporal resolution is required to resolve such signals in marine records. Recently it was shown, that fossil deep-sea corals are a powerful archive for reconstruction of circulation modes of the past oceans at a high temporal resolution as corals are not affected by bioturbation as are foraminifera (Mangini et al., 1998; Adkins et al., 1998). Coupled ^{14}C- (via AMS) and $^{230}Th/\ ^{238}U$- (via TIMS) measurements on carbonate of coral carbonate, delivers a snapshot of the ^{14}C-concentration of deep water. We analysed eleven deep sea corals from the north-eastern Atlantic grown between 39,200 and 9,200 years ago, which deliver seven new ventilation ages of deep water in the Eastern Northern Atlantic. Together with seven samples earlier published they span the time period from the LGM to the early Holocene where the sharp changes of deep water ventilation are expected (Mangini et al., 1998, Adkins et al., 1998, Lomitschka & Mangini, 1999). The reservoir-corrected ventilation ages from North Atlantic deep sea corals range between several hundred of years and a maximum value of 1,300 years and extend between 9.2 ka and 22.4 ka BP, covering the transition from the LGM into the Holocene. The shorter ventilation ages in the period of Bölling/Allerod correspond to the one of the modern Atlantic. We observe minimum ventilation at 9.2-9.8, 14.1, 15.4 and 22.4 ka BP Comparison with the timing of melt water pulses during deglaciation (Fairbanks et al., 1989) suggests that the periods of increased deep water ages follow melt water events in the North Atlantic at about 14 and 11 ka BP (Fairbanks, 1989; Bard et al., 1996). The higher ventilation age at 22.4 ka is assigned to Heinrich 2 event, dated at about 23 ka. The high temporal resolution of the deep sea corals evidences short periods of sluggish deep water circulation after pulses of fresh water discharge into the North Atlantic and associates the warmer N. Atlantic climatic conditions to the rate of formation of N.A. deep water.

Adkins JF, Cheng H, Boyle EA, Druffel ERM, Edwards RL, *Science*, **280**, 725-728, (1998).

Bard E, Hamelin B, Arnold M, Montaggioni L, Cabioch G, Faure G, Rougerie F, *Nature*, **382**, 241-243, (1996).

Fairbanks RG, *Nature*, **342**, 637-642, (1989).

Mangini A, Lomitschka M, Eichstädter R, Frank N, Vogler S, Bonani G, Hajdas I, Pätzold J, *Nature*, **392**, 347-348, (1999).

Lomitschka M, Mangini A, *Earth. Planet Sci. Lett.*, **170**, 391-401, (1999).

Stocker TF, Wright DG, *Radiocarbon*, **28**, 359-366, (1998).