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Holocene climate changes in the Adélie Land region (East Antarctica) as recorded by diatoms

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Core MD03-2601 was retrieved by 66˚04'S and 138˚34'E in a small depression of the Adélie Trough (East Antarctica) during CADO cruise (Images X, MD130 cruise). The core represents a 40 meters long undisturbed sequence of diatom ooze that, based on five ^{14}C dates performed on humic acids, covers the Holocene period from 900 yr B.P. to 10900 yr B.P with sedimentation rates between 0.3 cm.yr-^{1} and 0.7 cm.yr-^{1}. The core therefore has a great potential to reconstruct Holocene climate changes at sub-decadal resolution.

Diatom census counts, biogenic opal content and carbon and nitrogen isotope ratios of bulk organic matter display climate-related variations at several time-scales. First, the Holocene can be separated into four periods: a two-phase warmer and more productive Hypsithermal between 10900 yr B.P. and 4500 yr B.P. and interrupted by a cold event between 9500 yr B.P. and 7700 yr B.P., and a cooler and less productive Neoglacial between 4400 yr B.P. and 900 yr B.P. The Hypsithermal to Neoglacial transition lasted here less than 100 years and is rather in phase with other records from the East Antarctica region (Porter et al., 2000; Hodell et al., 2001). This transition is on the other hand out-of-phase with records from West Antarctica region (Taylor et al., 2001; Brachfeld et al., 2002). Rapid climate variations imprinted in sea ice cover and productivity changes are superimposed to the Holocence trend with frequencies of about 75 years and 200-300 years that might be linked to solar activity (Leventer et al., 1996).

Downcore variations of carbon isotope ratios in core MD03-2601 seem comparable to temperature anomalies recorded at the nearby Dome C site (Masson-Delmotte et al.,

2004) although out-of-phase. This indicates that the 1300 years reservoir age used to correct the ^{14}C dates is not well adapted here and that it might have varied throughout the Holocene.