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Poster

C-14 dating of the 32.4 m long Holocene CALYPSO Core MD99-2286 from the Skagerrak

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Marine sediments in the 32.4 m long piston core MD99-2286 provide a continuous and detailed paleoceanographic and paleoenvironmental record of the last 12 000 calendar years in the Skagerrak. The depositional environment is characterised by high sedimentation rates and intense water mass mixing, as a branch of the North Atlantic Current turns anti-clockwise, slows down and becomes mixed with other waters to form the Norwegian Coastal Current. Present-day SSTs in the Skagerrak are strongly linked to the NAO-index.

Chronostratigraphic control of core MD99-2286 is supplied by twenty-five AMS C-14 dates, performed on mixed foraminifera and seven mollusc shell samples of known species. The radiocarbon dates were calibrated using the CALIB (rev 4.3) software, with a δR -value of -40 ± 25 ^{14}C -years. The samples were assumed to consist of 100% marine carbon, and the calibration data set MARINE98 was used.

The calibrated ages show that core MD992286 spans 12037 years, covering the entire Holocene and the latest Pleistocene. The inferred sedimentation rate gradually increases with time (with minor exceptions), from 0.05 cm/y at 12000 y BP to about 1 cm/y in the recent sediments. The latter is consistent with the measured modern sedimentation rate of > 0.6 cm/y.

The twelve dates in the top ten metres of the core are somewhat problematic, as the ages in every other sample are older or of identical age as the closest underlying sample. This consistent pattern cannot be explained by the order of analyses, as samples from different depths were analysed in random order. Too old ages can be explained by reworking, whereas too young ages can be explained by contamination with modern carbon or by deep burrowing of the dated species. Contamination errors are generally only likely in foraminifer samples, as these are not etched. Errors from deep burrowing is less likely as all of the dated mollusc-species are known not to burrow more than ca. 10 cm into the substratum. By assuming that all samples yielding older or identical ages as the closest underlying samples are reworked, it follows that these should be excluded from the construction of the sedimentation rate. Another possibility is to fit a series of straight lines through the 1-sigma error bars of all samples in this interval.

The CALYPSO-corer used for core MD99-2286 is believed to disturb the topmost sediments in cores. Therefore, a 2.5 m long gravity core, Sk000209-2, was retrieved from a nearby location in order to get full recovery of the surface sediments. The age model for core Sk000209-2, based on 7 Pb-210 dates and 2 AMS C-14 dates, shows that core Sk000209-2 spans almost 900 calendar years and that the core top is of modern (zero) age. Correlation between the two cores using susceptibility, GRA-density and carbonate content indicate that the core top in MD99-2286 is of modern (zero) age and only slightly more disturbed than core Sk000209-2. The core correlation also shows that the sediment in the top 4 metres of the CALYPSO core MD99-2286 is expanded by a factor 1.6 relative to the sediment in the gravity core Sk000209-2.