

Sediment echo-sounding and gravity coring for investigation of Quaternary deposits in Skagerrak and Norwegian Trench area

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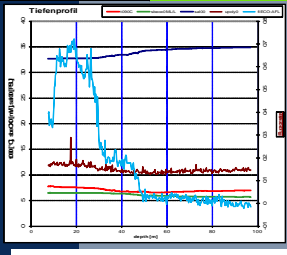
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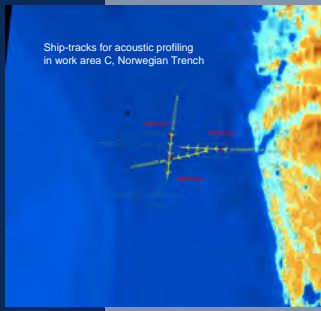
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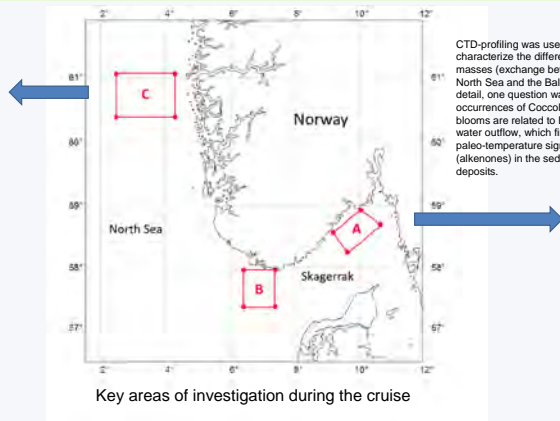
The aim of R.V. "Elisabeth Mann Borgese" cruise 046 in May 2013 was to take sediment cores at carefully selected sites for high-resolution reconstructions of mid- to late Holocene paleo-environmental changes in the Skagerrak and Norwegian Trench region. The cruise is part of an international project dealing with the topic: "Climate forcing factors for marine environmental change during the mid and late Holocene - a link between the eastern Atlantic and the Baltic Sea".



CTD profile at station 5 in work area C. The surface water layer (down to about 50 m) only slightly differs in temperature and salinity from the deeper horizon, but is also characterized by enhanced plankton activity (chlorophyll A).



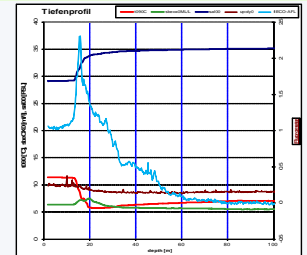
Ship-tracks for acoustic profiling in work area C, Norwegian Trench



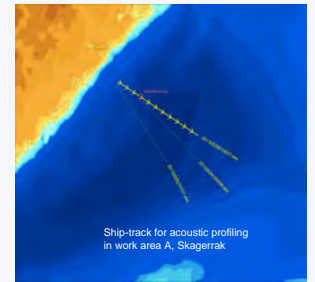
Key areas of investigation during the cruise

Seismoacoustic profiling using the INNOMAR SES 2000 was performed prior to coring in order to select most suitable sites. Former studies proved that the acoustically rather homogenous upper unit (up to 10 m thickness) overlaying a section with many reflectors (late Glacial and Deglacial clayey sediments) represent the mid- to late Holocene sequence of interest for our paleoenvironmental reconstructions. Locations with thick homogenous sequences were cored.

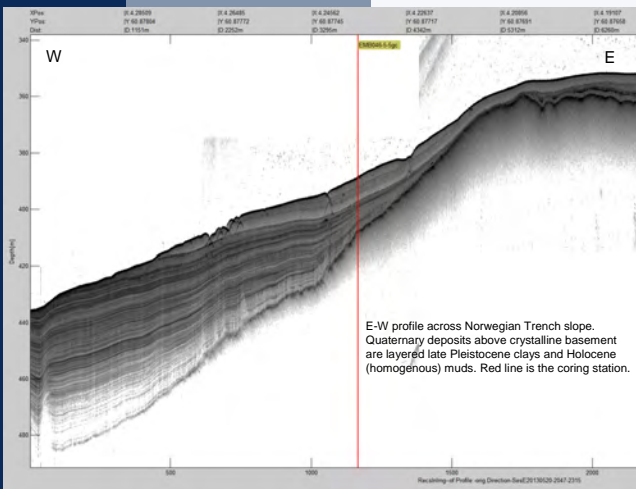
CTD-profiling was used to characterize the different water masses (exchange between the North Sea and the Baltic Sea). In detail, one question was if the occurrences of Coccolithophore-blooms are related to Baltic Sea water outflow, which finally leave a paleo-temperature signal (alkenones) in the sedimentary deposits.



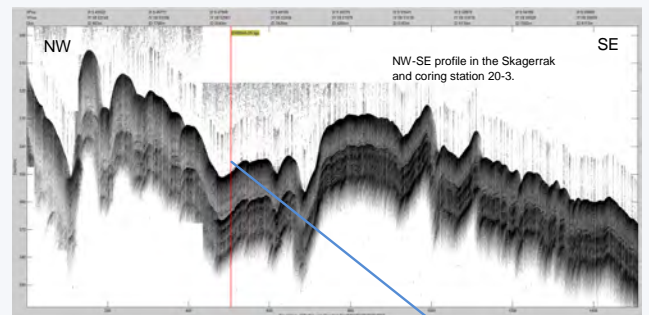
CTD profile at station 20 in work area A. The outflowing surface water from Baltic Sea is characterized by lower salinity (dark blue) and higher temperature (red). Maximum chlorophyll (light blue) is visible just at the border line before the mixed surface layer.



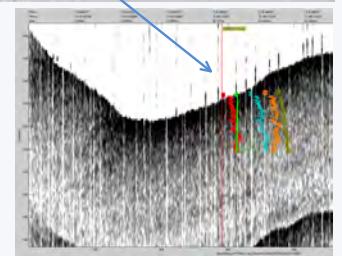
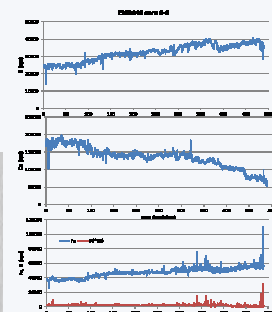
Ship-track for acoustic profiling in work area A, Skagerrak



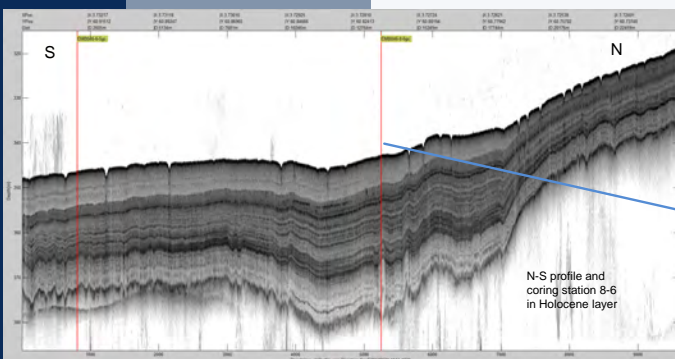
E-W profile across Norwegian Trench slope. Quaternary deposits above crystalline basement are layered late Pleistocene clays and Holocene (homogenous) muds. Red line is the coring station.



NW-SE profile in the Skagerrak and coring station 20-3.



First results of high resolution XRF-core scanning (done in IOW-lab) show variations and trends of major elements (e.g. Si, S, K, Ca, Fe) in the sediment core profile reflecting changes in the delivery of sediment material dependent on environmental conditions and diagenetic processes.



N-S profile and coring station 8-6 in Holocene layer

In the IOW laboratory, based on ongoing XRF scanning and magnetic susceptibility measurements and supported by AMS14C dating key-sites will be selected for the time-consuming geochemical, biomarker (e.g. alkenone temperatures) and micropaleontological proxy analyses to be performed.