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Reconstruction of the variability of surface water characteristics and terrigenous input in the north Pacific and Bering Sea: A biomarker approach.

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Overall goal of the study of sediment material collected during RV Sonne Cruise 202 (INOPEX) in 2009, is the reconstruction of the variability of and linkages between surface-water characteristic and terrigenous input in the (sub-) polar North Pacific/Bering Sea and their relationship to global climate change, using organic-geochemical proxies (i.e. organic-geochemical bulk parameters and specific biomarkers (TOC, hydrogen indices; long-chain n-alkanes, sterols, alkenones; Uk37 and TEX86-Index; BIT-Index; HBIs, IP25). In this poster, first results of analyses of surface sediments and selected sediment cores are presented.
TOC contents in surface sediment vary between 0.2 and 1.5%. The maximum values are restricted to the westernmost part of North Pacific and to the Bering Sea. Maximum hydrogen index (HI) values of >150 to 232 mgHC/gC are observed in the Bering Sea, suggesting significant amount of marine OC being preserved in the surface sediments. In the same area, also increased numbers of chlorophyll a were measured in the surface water, suggesting increased primary production as cause for increased marine OC values in the studied surface sediments. In the North Pacific, on the other hand, HI values are <150 mgHC/gC, pointing to the predominance of terrigenous OC input, probably partly supplied by westerlies from the Asian continent. The distribution pattern of long-chain n-alkanes generally supports the HI data. Here, of course, further studies are needed before a more precise statement about the OC sources and transport processes can be done.
The alkenone-based sea-surface temperature (SST) varies between 6°C in the northern part of Bering Sea and 18°C in the North Pacific, close to the Japanese coast. These results are in absolute numbers a few degrees higher than the modern measured temperatures, but show the same latitudinal distribution pattern. In order to reconstruct the sea-ice cover, the newly developed so-called "IP25 Index" was used. The absence of IP25 in the surface sediments may reflect the modern dominantly open-water conditions throughout the year. We expect, however, to find IP25 in core intervals representing glacial periods.
In selected sediment cores representing the late Quaternary time interval, TOC values vary between 0.15 and 1.5%, showing both distinct long-term trends and short-term, high-amplitude variabilities. For further interpretation of the TOC records, information on the source of the OC (i.e. HI values and biomarker data) as well as a better chronology are needed.