# Late Pleistocene to Holocene paleoceanographic reconstructions at Shirshov Ridge, western Bering Sea

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The Bering Sea as a marginal sea of the Pacific links this ocean via the Bering Strait with the Arctic Ocean and the N-Atlantic. Thus, it is thought to contribute to changes in Earth's climate, especially in the quasi-regular glacial-interglacial cycles of the Quaternary by affecting meridional overturning circulation or by atmospheric teleconnections. However, a relatively shallow carbonate compensation depth and coeval corrosive bottom waters prohibit the preservation of calcareous microfossils within most of the Bering Sea sediments and assessment of paleoceanographic changes during the Quaternary.

Here, we present sediment records from the Shirshov Ridge, a morphological high in the western Bering Sea between 55-60°N and 169-172°E, recovered during RV Sonne cruise SO201-2 in fall 2009. Selected cores lie on a N-S-transect covering intermediate to deepwater levels and will allow to address scientific hypotheses concerning the formation of intermediate water masses in the N-Pacific, the glacial development of Kamchatka, and most of all the hypothesized sea surface temperature seesaw pattern between the N-Pacific and N-Atlantic (KIM ET AL., 2004).

High-resolution core stratigraphy is based on AMS$^{14}$C-datings, isotope stratigraphy, tephrochronology, and magnetostratigraphy. (Sub)sea surface temperatures will be reconstructed using foraminiferal Mg/Ca, the $U^{K'}_{37}$-index, and stable oxygen isotopes ($\delta^{18}O$). Sea water salinities will be derived from a combined $\delta^{18}O$-Mg/Ca-approach. Ice-rafted debris (IRD) will be used to reconstruct sea ice coverage. The ventilation of intermediate water masses will be inferred by evaluating the stable carbon isotopic composition ($\delta^{13}C$) of epibenthic foraminifera. We assess past terrigenous fluxes and marine productivity by XRF-scanning as well as by the determination of TOC and biogenic opal.

The sediment archives cover at least two glacial-interglacial cycles. Full glacial sediments are surprisingly void of IRD, suggesting that no or perennial sea ice existed in the Shirshov Ridge area. Deglacial and interglacial sediments are typically abundant in diatoms and even calcitic foraminifers, pointing to an extremely enhanced marine productivity. The high-resolution records from Shirshov Ridge reveal a millennial-scale cyclic pattern of lithological changes within the frequency range of Dansgaard-Oeschger cycles and Heinrich events.

These results are comparable with previous studies in the adjacent Sea of Okhotsk (NÜRNBERG & TIEDEMANN, 2004) which suggest that environmental changes in that area and in SE Asia were closely related via the Siberian atmospheric high-pressure cell. During full glacial times the Okhotsk Sea records point to a strong Siberian High causing northerly wind directions, the extension of the sea ice cover, and a reduced fluvial discharge. Deglacial maxima of terrigenous flux were succeeded by or synchronous to high-productivity events. During interglacials, SE monsoonal winds prevailed, analogous to today's summer situation of a pronounced Mongolian Heat Low and a strong Hawaiian High. Strong freshwater discharge and a seasonally reduced and mobile sea ice cover favored marine productivity and a lowered flux of IRD.

## References

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