



Teleconnections between North Pacific and North Atlantic climate variations during the last deglaciation from laminated sediments

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Past oceanographic and climatic changes in the North Pacific and its remote interplay with the North Atlantic are only poorly constrained mainly due to the limited number of sediment records and the poor preservation of carbonate-bearing sediments. Sediment core SO201-2-114-KL from the western Bering Sea (167°E, 59.23°N, 1394 m WD) features laminated sediment units representing the Bølling-Allerød (BA) and the Preboreal (PB), which is a common feature in the North Pacific and the Bering Sea. They are considered to reflect changes in bottom ventilation and/or surface productivity. The cause of the wide-spread occurrence of laminated sediments in the North Pacific still remains elusive. Alkenone-based reconstructed sea surface temperatures in conjunction with ultra high-resolution XRF scanning of sediment core SO201-2-114-KL reveal that laminated sediments manifest a North Pacific warming in concert with the North Atlantic. This is associated with a retreat of sea ice and the increase of sea surface productivity in the western Bering Sea during the BA and PB that induces the laminae formation. The geochemical variability of laminations points to interannual and decadal fluctuations of the sea surface temperature and consequently the sea ice extent, which might be paced by the Pacific Decadal Oscillation and the El Niño-Southern Oscillation. Freshwater hosing experiments with the comprehensive climate model CCSM3 simulating the BA and the Heinrich Stadial 1 point as well to the inter-basin dependence between the North Atlantic and North Pacific. The remote and synchronous response of the North Pacific to climate anomalies in the North Atlantic emanates from changes in atmospheric circulation. This emphasizes the primarily atmospheric origin of the laminae formation and their internal geochemical variability. Furthermore, an inverse pattern of overturning in both ocean basins is evident, which supports the inferred prevalence of low ventilation rates during the time of laminae formation. It confirms the operation of a Pacific–Atlantic seesaw in overturning circulation.