



Multi-proxy approach provides new data on land-ocean coupling mechanisms in the Gulf of Alaska (NE Pacific) during the Mid Pleistocene Transition

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The exact timing and mechanism(s) that caused a change from a low- to high-amplitude glacial variability during the Mid Pleistocene Transition (MPT) - a fundamental shift in Earth's climate system - are still under debate. Most studies targeting the MPT are based on Atlantic sediment records whereas only few data sets are available from the North Pacific (see Clark et al., 2006 and McClymont et al., 2013 for reviews).

IODP Expedition 341 distal deep-water site U1417 in the Gulf of Alaska (subpolar NE Pacific) now provides a continuous sediment record for reconstructing Miocene to Late Pleistocene changes in the sea surface conditions and their linkage to ice-sheet fluctuations on land.

Here we present organic geochemical biomarker data covering the 1.5 Ma to 0.1 Ma time interval with special focus on the MPT. Alkenone, sterol, n-alkane and C₂₅ highly branched isoprenoid data are used to reconstruct sea surface temperatures, primary productivity and terrigenous organic matter input (via sea ice, icebergs, meltwater discharge or aeolian transport). In addition, the diatom concentration and the species composition of the diatom assemblage allow estimates of palaeoproductivity and nutrient (silicate) availability. Information about ice-sheet dynamics (and associated iceberg calving) and sea ice coverage is derived from ice rafted detritus (IRD) data. A key observation is a significant SST cooling at about 1 Ma, which is in close agreement with other Northern Hemisphere SST records. We further observe that short-term maxima in the diatom abundances coincide with peak deposition of terrigenous biomarkers and IRD minima.

References

- Clark, P.U. et al. 2006. *Quaternary Science Reviews*, 25 (23–24): 3150-3184.
McClymont, E.L. et al. 2013. *Earth-Science Reviews* 123: 173-193.