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The Nordic Seas in the Pliocene: A hot spot or not?

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The Pliocene section of ODP Site 642B (Eastern Nordic Seas, 1286 m water depth) is studied to determine the role of the Nordic Seas, as a gateway linking the North Atlantic and the Arctic, though the last time Earth's climate was close to equilibrium with a greenhouse gas forcing comparable to the present. The site is located underneath the present pathway of the Norwegian Atlantic Current, detecting changes in the strength of polar heat transport. A multi-proxy approach is used to characterize the Pliocene conditions through the water column. The predominant conditions changes at several occasions through the Pliocene, e.g. with summer mixed layer temperatures switching between periods with warmer than present by 1-2°C to colder than present by 1°C. Occasionally strong fresh water influence on the surface water is also indicated. Bellow the summer mixed layer, colder and/or saltier conditions than presently is seen through most of the Pliocene. The bottom water is occasionally significantly saltier than presently. Reduced stratification between subsurface and bottom water is seen though most of the Pliocene, and ventilation of the bottom water at the site switches between being less ventilated than today or comparable to the present. Strong gas exchange with the atmosphere and/or high organic production is seen for most of the Pliocene. The oceanographic conditions in the Norwegian Sea were distinctly different from the present day conditions throughout much of the Pliocene. However, our records show no indication of the extreme polar amplification, or of a super-conveyer, previously argued to characterize the Nordic Seas during parts of the Pliocene.