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Nordic Sea convection led abrupt North Atlantic warm events during Dansgaard-Oeschger cycles

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During the last glacial period changes in the strength of ocean convection in the high-northern latitudes contributed to abrupt global climate changes known as Dansgaard–Oeschger (DO) cycles. However, the lack of high-resolution empirical evidence has yet precluded inferring the physical coupling between ocean and atmosphere. We examined Nordic Sea (NS) circulation changes by reconstructing radiocarbon ventilation ages across four DO cycles in a marine sediment core hinging on a precise multi-tephra-based synchronization to Greenland ice cores. Our results show that open ocean convection in the NS resumed ahead of the abrupt air-temperature increases recorded in ice cores by ~400 years (95% range: 50–660 years). Thus, implying an active role of ocean dynamics where abrupt warming transitions are likely a nonlinear response to more gradual resumption of NS convection.