



The Atlantic deep water circulation during the last interglacial

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Understanding how the Atlantic Meridional Overturning Circulation (AMOC) evolved during crucial past geological periods is crucial in order to decipher the interplay between ocean dynamics and global climate change. Previous research, based on geological proxies, has provided invaluable insights into past AMOC changes. However, the causes of the changes in water mass distributions in the Atlantic during different periods remain mostly elusive. Using a state-of-the-art Earth system model, we show that the bulk of NCW in the deep South Atlantic Ocean below 4000 m migrated from the western basins at 125ka to the eastern basins at 115ka, though the AMOC strength is only slightly reduced. These change are consistent with proxy records, and it is mainly due to more penetration of the AABW at depth at 115ka, as a result of a larger density of AABW formed at 115ka. Our results show that depth changes in regional deep water pathways can result in large local changes, while the overall AMOC structure hardly changes. Future research should thus be careful when interpreting single proxy records in terms of large-scale AMOC changes, and considering variability of water-mass distributions on sub-basin scale would give more comprehensive interpretations of sediment records.