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Assessing the stability of the AMOC during past warm climates

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There is emergent evidence that abrupt shifts of the Atlantic Meridional Overturning Circulation (AMOC) have occurred during interglacial periods, with recent observations and model simulations showing that we may have over-estimated its stability during warm climates. In this study, we present a multi-proxy reconstruction of deep-water characteristics from the Rockall Trough in the Eastern North Atlantic to assess the variability of Nordic seas and Labrador Sea deep-water formation during past interglacial periods MIS 1, 5, 11, and 19. To test the warm climate stability hypothesis and to constrain the variability of deep-water formation for past warm climates, we performed geochemical analysis on planktic (Nd isotopes) and benthic foraminifera ($\delta^{18}O$ and $\delta^{13}C$) along with sedimentological analysis. This approach allows us to reconstruct paleocurrent flow strength, as well as the origin and contribution of different water masses to one of the deep-water components of the AMOC in the Rockall Trough. We found that deep-water properties varied considerably during each of our chosen periods. For example during the Holocene εNd variability is smaller (1.8 per mil) when compared to variability during MIS 19 (3.3 per mil), an interglacial that experienced very similar orbital boundary conditions. Our results confirm that deep-water variability in the eastern North Atlantic basin was more variable in previous interglacial periods when compared to our current Holocene and provide new insight into the relative contribution of Nordic Seas Deep Water and Labrador Sea Water in the Rockall trough.