



Holocene variability in the North sub-Polar Gyre

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The distribution of heat and moisture between low and high latitudes is for a large part controlled by the North Atlantic Ocean circulation and the dynamics of the sub-tropical (STG) and sub-polar gyre (SPG). Here, we present a new high-resolution (~ 25 yrs) sea surface temperature (SST) reconstruction over the Holocene (last 10,000 years) in the subpolar North Atlantic. This time series was obtained by alkenone thermometry from the marine sediment core MD95-2015 located South of Iceland, on the eastern flank of the Reykjanes Ridge. Our data reveal three distinct time intervals corresponding to different sub-polar gyre circulation modes. A first period, in the Early Holocene, when the Laurentide ice sheet melting supplied fresh water in the Labrador Sea which contributed to stabilize vertical mixing; a second time period, ranging from ~ 6500 yr BP to ~ 3000 yr BP, during which the SPG was more active and vertical mixing more intense; a third one, encompassing the last millennia of the Late Holocene, when the gyre appeared to have narrowed and weakened. We compare our data with previous paleo-observations and discuss possible causes for these dynamical patterns of the SPG.