Deep Ocean Ventilation in the North Atlantic during the Younger Dryas

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The Younger Dryas (YD) is arguably the most studied centennial-to-millennial scale climate change of our geologic past, yet its origin remains debated. Disruption of the northward heat flux by the Atlantic Meridional Overturning Circulation (AMOC) has been widely thought as the cause of surface air and surface sea water cooling in the circum North Atlantic inferred from Greenland ice and deep-sea sediment cores during the YD. However, different paleoceanographic reconstructions, usually based on a single record, have led to different inferences about changes in meridional circulation during the YD, varying from only a partial weakening in the deep ocean to almost full collapse at both abyssal and intermediate depths. Here we present new benthic foraminiferal (BF) radiocarbon data from the intermediate and deep North Atlantic and a compilation of Atlantic BF and deep-sea coral radiocarbon data including more than 200 data points and spanning the depth range 200-5000 m and the time interval 14.5-10 kyr BP. Stimulated by the data, the hypothesis is formulated that, compared to the Bølling-Allerød warm interval that preceded the YD cold spell, mid-depth ventilation was as strong or strengthened, and ventilation of the deep North Atlantic was probably weakened but not stopped.