New constraints on Atlantic Meridional Overturning Circulation changes during the past 40 ky from combined $^{231}Pa/^{230}Th$, benthic $\delta^{13}C$ and ^{14}C benthic-planktonic ventilation ages

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The Atlantic Meridional Overturning Circulation (AMOC) is a major component of the climate system through its impact on low to high latitude heat transport and CO_2 air-sea exchange. Despite numerous studies, its role in abrupt climate changes of the last glacial period is still poorly constrained. This study aims at better understanding the evolution of the AMOC by combining, within the same core, different circulation proxies such as the sedimentary $^{231}Pa/^{230}Th$, which documents changes in the water masses flow rate, benthic $\delta^{13}C$ which reflects the ventilation state of bottom water and paired benthic-planktonic ^{14}C measurements which indicate deep and shallow water masses ages.

We present new multi-proxy time series from North Atlantic core SU90-08 (43°N, 30°W, 3,080 m) for the last 28 ky and around Heinrich Stadial (HS) 4. $^{231}Pa/^{230}Th$ exhibits lower values for the Last Glacial Maximum (LGM) compared to the rest of the dataset. This suggests stronger flow rate at the LGM than during the Holocene above the core site. $^{231}Pa/^{230}Th$ also suggests slightly reduced circulation over HS 1 and HS 4. Benthic $\delta^{13}C$ displays slightly depleted values for HS 4 and very depleted values from 27 ky cal BP to the onset of the deglaciation. This would imply that deep water mass that bathed this location at the LGM was poorly ventilated while $^{231}Pa/^{230}Th$ over the same period indicates that the circulation was vigourous. We will discuss the apparent decoupling between $^{231}Pa/^{230}Th$ and benthic $\delta^{13}C$ during the LGM in the light of benthic and planktonic ^{14}C ages spanning the last 25 ky.