Laurentian Channel bottom water temperature as a proxy for AMOC intensity

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It was recently suggested that the AMOC dramatically weakened during the last century, which is thought to be exceptional during the last millenium[1]. This weakening should translate into a decrease in the strength of the Labrador Current (LC), the Labrador Subarctic Slope Water (LSSW) and the recirculation gyre in the western North Atlantic. Consequently, this should allow the Gulf Stream to penetrate onto the East Canadian shelf. Interestingly, this change should be recorded by Laurentian channel bottom water, which take its source at around 450 meters depth.

We observed strong similarity between the instrumental temperature of the Laurentian channel bottom water and the AMOC-index[1] for the last 70 years. In addition, recent warming in the Laurentian Channel was attributed to a change in the proportion of water masses entering the channel, namely an increase proportion of Atlantic Temperate Slope Water (ATSW). Interestingly, the increase of the ATSW was seen in annually-resolved $\delta^{15}N$ from corals off the East Canadian coast suggesting the increased presence of nutrient-rich water during the last century, a unique feature of the last millennium[2].

Thus, we believe that temperature of the Laurentian channel bottom water can serve as a robust proxy to reconstruct the AMOC intensity. This present a crucial advantage: temperature is a relatively straightforward parameter to reconstruct and $\delta^{18}O$ of benthic foraminifera was proven a solid temperature proxy for this water mass[3].

Here we used sediment record from the Laurentian Channel to investigate the presence of warm water originating from the Gulf Stream and thus the AMOC intensity. Our results suggest that the last century warming is unprecedented not only for the last millennium but for the last 6 000 years.

[1]Rahmstorf, S. *et al.,* 2015. *Nat. Clim. Chang.* 5, 475–480.
[2]Sherwood, O. A., *et al.,* 2011. *Proc. Natl. Acad. Sci. U. S. A.* 108, 1011–5.
[3]Thibodeau, B., *et al*., 2010. *Geophys. Res. Lett.* 37.