Variability of the Meridional Overturning Circulation observed since 1993 across the A25-OVIDE section in the North Atlantic subpolar gyre, and its impact on the physical pump of the anthropogenic CO_2

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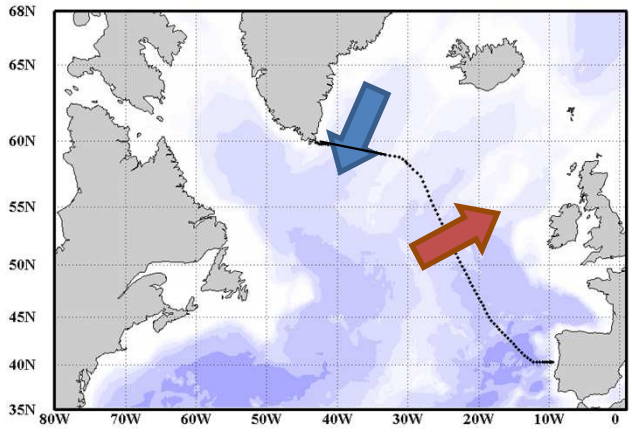
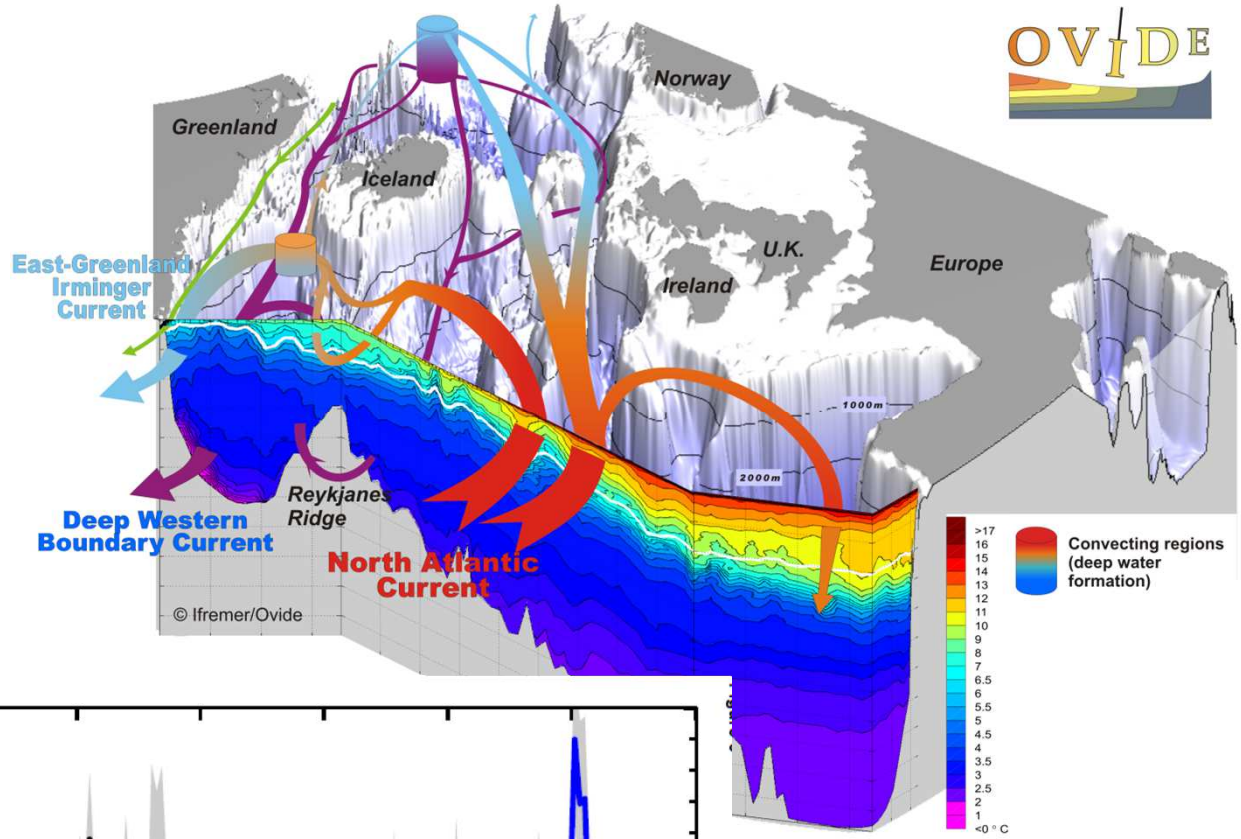
Observing the ocean

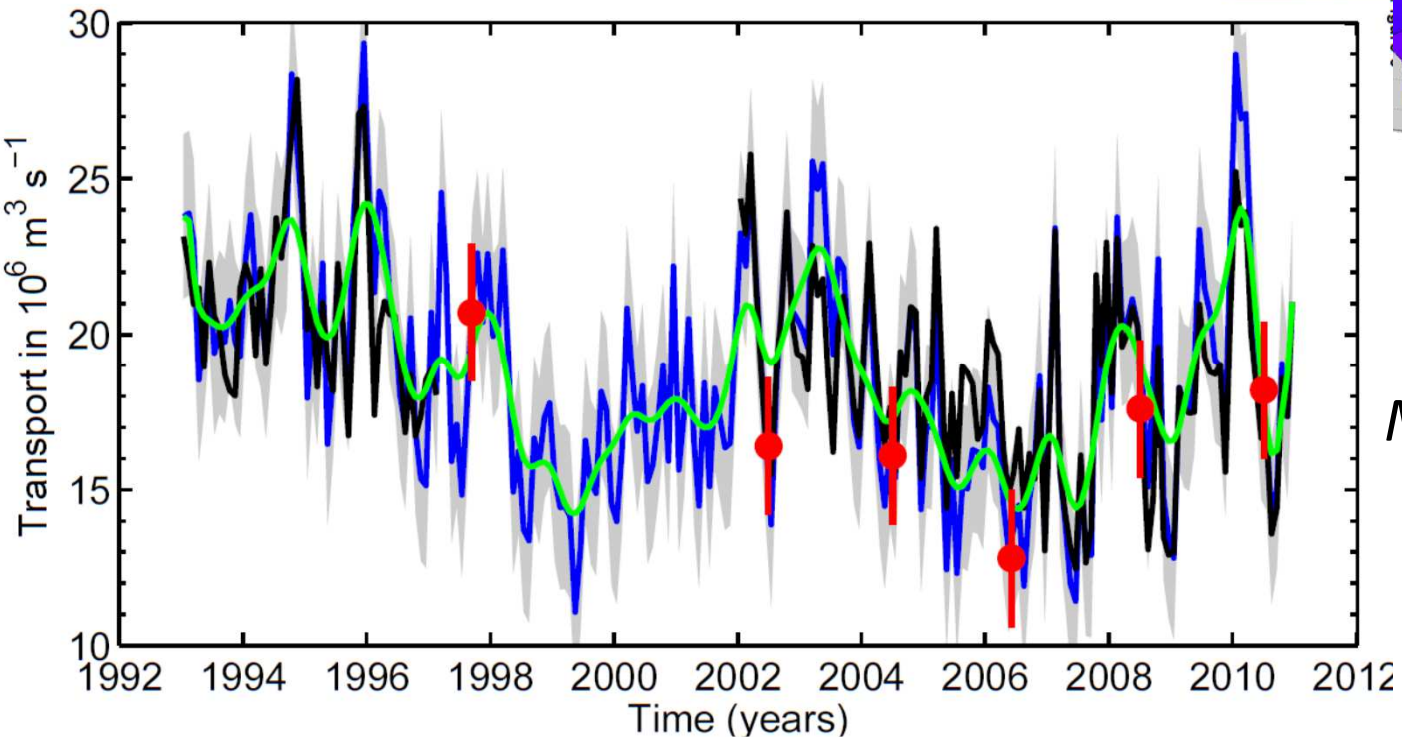
- Combining satellite altimetry and ARGO data, we built an index of the Meridional Overturning Circulation in the north-east Atlantic since 1993



- This index was validated by in-situ independent estimates from biennial OVIDE oceanographic cruises since 2002

Meridional Overturning Circulation



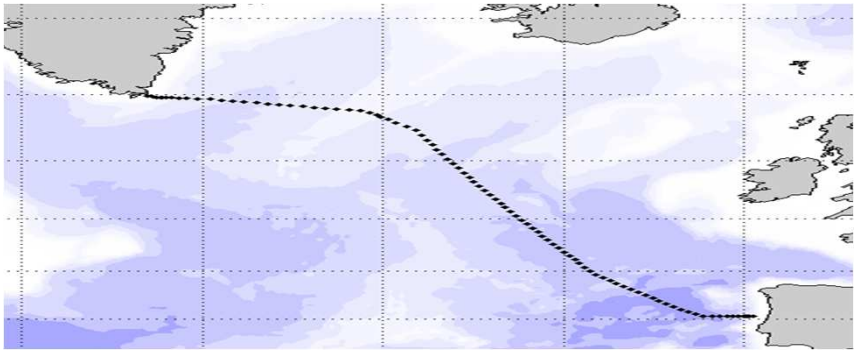


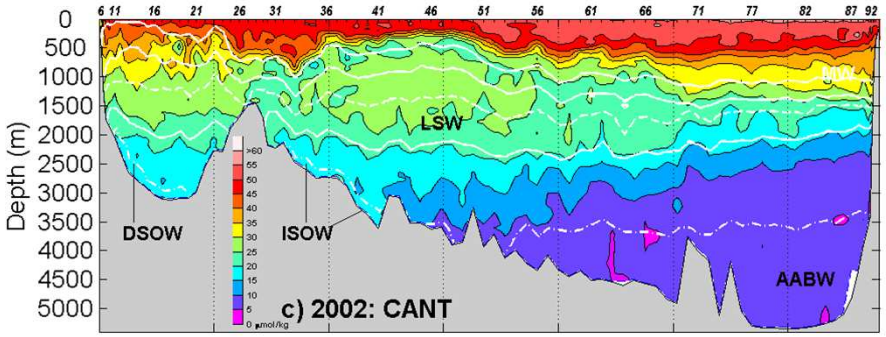
Mercier et al., 2015

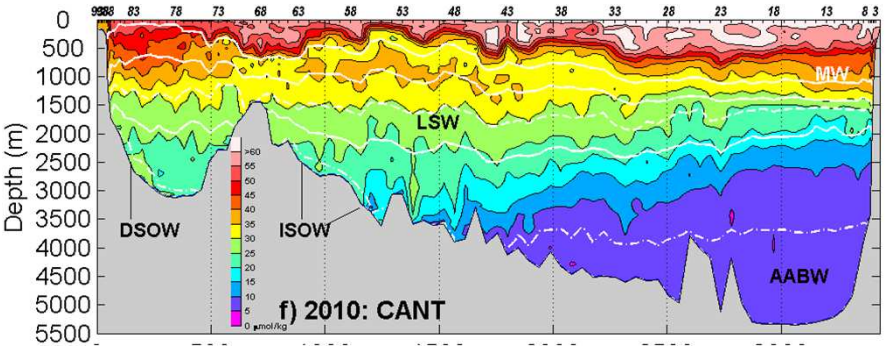
Variability of the MOC

- A strong decadal variability is observed, confirmed by the latest observations
- Models give clues on the underlying mechanisms (*Visbeck et al., 2003; Barrier et al., 2014*…)
- The intensity of the MOC is essential not only for the heat transport to the Arctic, but also for the storage of anthropogenic CO_2 in the North Atlantic, that accounts for 25% of the total storage in the ocean.

CO_2 storage in the North Atlantic







- The concentration of anthropogenic carbon increases in the whole subpolar gyre
- Its storage is modulated by the intensity of the MOC that brings the Cant-rich subtropical water to the areas of deep-water formation (*Perez et al., 2013)*
- An index was built to evaluate the impact of the MOC on the CO_2 physical pump in models (*Zunino et al., 2014)*


Thank you