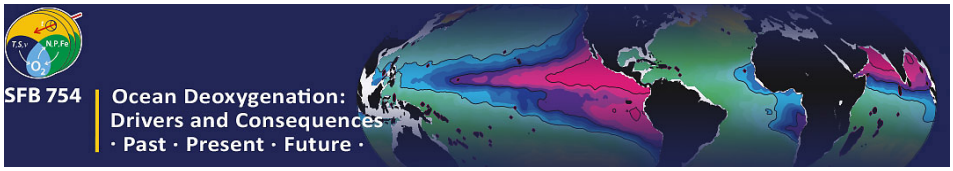

Contribution ID : **62** Type : **Oral**

Early detection of anthropogenic climate change signal in the interior subpolar North Atlantic oxygen

Monday, 3 September 2018 17:45 (15)

The response of oxygen concentrations in the subpolar North Atlantic (SPNA) to future climate change is poorly understood. Here, we investigate the multi-decadal variability in the interior oxygen at 1500 m depth and its association with the North Atlantic subpolar gyre index (a proxy for the subpolar gyre strength) for both models and data. During its positive phase, persistent anomalously strong mixing in the Labrador Sea entrains oxygen-rich water into the interior southern SPNA, while the opposite is true during a negative phase. We evaluate a suite of IPCC-class Earth System Models (ESMs) according to their fitness in representing the observed variability. Under a high CO2 future scenario, the best performing ESMs project a steady decline in the SPNA oxygen, driven partly by lower oxygen solubility in warmer climate and partly by increases in apparent oxygen utilization largely due to the long-term weakening of the LSW ventilation. The projected deoxygenation is shown to depend on the sensitivity of the simulated Labrador Sea mixed layer depth to temperature increase. This anthropogenic signal on the interior Labrador Sea oxygen is projected to emerge in the early 21st century, decades before the temperature and salinity signals, suggesting that the interior oxygen in the study region is more sensitive to circulation changes than temperature and salinity.

Position

Senior Scientist

Affiliation

Uni Research Climate, Bjerknes Centre

Email Address

jerry.tjiputra@uni.no

Are you a SFB 754 / Future Ocean member?

No

Primary author(s) : TJIPUTRA, Jerry (Uni Research Climate); GORIS, Nadine (Uni Research Climate); LAUVSET, Siv K. (Uni Research Climate); HEINZE, Christoph (University of Bergen); OLSEN, Are (University of Bergen); SCHWINGER, Jörg (Uni Research Climate); STEINFELDT, Reiner (University og Bremen)

Presenter(s) : TJIPUTRA, Jerry (Uni Research Climate)

Session Classification : 03 Ventilation and Oxygen Supply

Track Classification : 03 Ventilation and Oxygen Supply