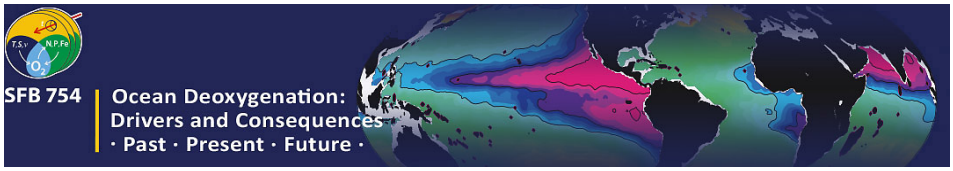

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Internal Variability as a Driver of Decadal Deoxygenation

Monday, 3 September 2018 15:00 (15)

Ocean deoxygenation in the past decades is commonly considered as a consequence of global warming. Because of large internal variability in the climate system, it is generally hard to robustly conclude the cause of deoxygenation from limited observations. Here, we explore the potential role of the internal variability in shaping the decadal deoxygenation using the MPI-ESM's Large Ensemble Simulations and the observations from World Ocean Database 2013. We find that the internal variability could induce basin-scale deoxygenation on multi-decadal timescales comparable to what has been observed in the past decades. This indicates that the internal variability could potentially dominate the multi-decadal trend of oceanic oxygen. We further analyzed the model outputs taking into account on past observational coverage. This approach will highlight the consequence of limited observational coverage on interpreting the multi-decadal oxygen trends. The limited number of observations could add spurious uncertainty on top of the uncertainty rising from the internal variability. These uncertainties are likely to persist in the near future projections under the stabilized climate scenario (RCP4.5), which could remain as a major obstacle on monitoring deoxygenation. The global and regional analyses also indicate the possible impact of multi-basin climatic processes, which could induce multi-decadal deoxygenation among multi-basins. This indicates that the role of decadal climate and ocean biogeochemical variability also need to be explored for the mechanistic understanding on multi-basin deoxygenation as well as improving the model.

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