## Meeting AMOC Observation Needs in a Changing Climate



Contribution ID: 69

Type: Talk

## Adjoint-based Assessment of Ocean Observing Network Design in the Subpolar North Atlantic

Wednesday 19 July 2023 12:15 (15 minutes)

A large ensemble of adjoint-based sensitivity experiments within the Arctic and Subpolar gyre sTate Estimate (ASTE) is used to interrogate the constraint provided by continuous monitoring at the Overturning in the Subpolar North Atlantic Program (OSNAP) array. Each ensemble member is designed to expose ocean adjustments impacting the hydrography sampled at an individual mooring within the array backbone. Sensitivity pattern correlations across the ensemble quantify the coherence between propagating signals sequestered in individual mooring time series. Low coherence results from strong sensitivity to local wind-stress curl, suggesting low data redundancy across much of the array. Larger coherence is found, however, on repeating this analysis using sensitivities shared by OSNAP observed quantities and remote heat transports across the Greenland-Scotland Ridge and Fram Strait, due to strong transport dependence on larger-scale wind stress variations along topographic waveguides upstream from these sections. Our approach complements traditional withholding experiments in identifying which observations constrain modelled transports most effectively. With the added advantage that this assessment is accompanied by a clear dynamical explanation, our work encourages further use of adjoints for ocean observing system assessment and design.

## Topic

Future AMOC observing -outlining a roadmap

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Track Classification: Roadmap for future