Using Ocean Data Assimilation to Explore Arctic/Subarctic Climate Variability

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Recent results

- Completed publication of the meeting report from the 2013 US AMOC-UK Rapid science meeting (Carton, et al. 2014)
- Made progress on upgrade of the Simple Ocean Data Assimilation (SODA) ocean reanalysis, which provide long-term estimates of AMOC and related meridional heat transports.
- Adoption of a new ocean/sea ice model based on GFDL MOM5.1 numerics (provisional name: SODA3.1).
- Development of a hybrid (ensemble/3DVAR) data assimilation filter as an eventual replacement for the data assimilation currently being used in SODA. The algorithm was published last year, a study using idealized data is under review (Penny et al. 2015*)* and an experiment using real (historical data) is being carried out now.
- Made progress on Arctic climate variability in CMIP-type coupled climate models. The student Yanni Ding completed her dissertation on this subject. The title of her dissertation is: Ocean Variability in CMIP5 Historical Simulations. The first paper on the response of the ocean to volcanic aerosols was published this year (Ding et al. 2014). The other studies are being prepared for publication.

Bibliography

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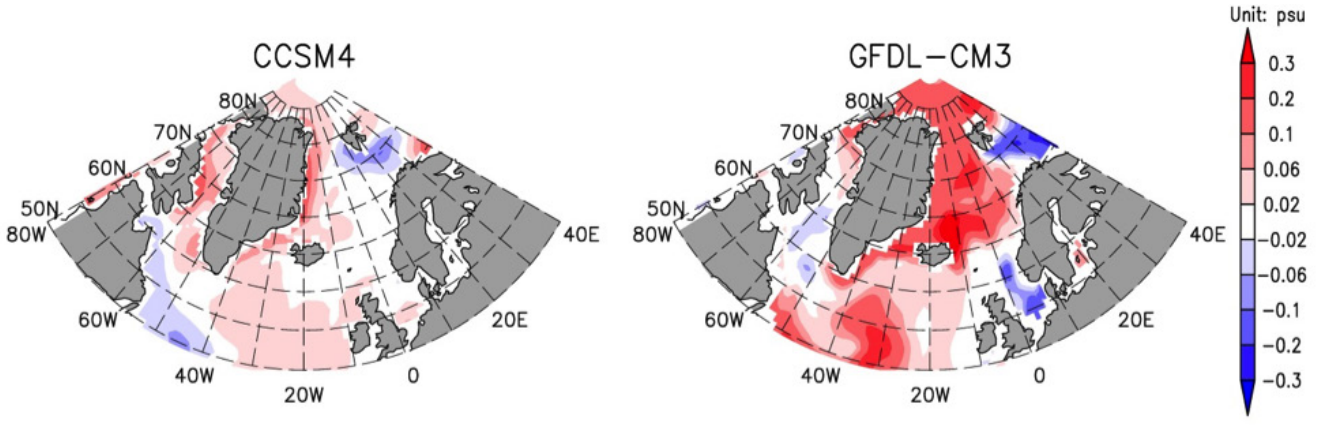

Figure 1. This is a figure from Ding et al. (2014) and shows the change in surface salinity (SSS) in the North Atlantic due to the eruption of Krakatoa as represented in ensembles of two widely used CMIP5 coupled climate models. CCSM4 shows a weak impact on SSS and as a consequence the eruption has little impact on the strength of AMOC. In contrast GFDL-CM3