

BIANNUAL ACHIEVEMENTS REPORT July 2015

The UK Overturning in the Subpolar North Atlantic Program (UK-OSNAP)

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Programme Status: **Green** - everything is on track.

Programme's key achievements and overall progress over the last 6 months:

1. A full year of the OSNAP observing array

Seaglider patrols have successfully delivered a full year of data (summer 2014 to summer 2015) along the eastern OSNAP line, as planned. We have made significant progress in developing glider data processing and quality control. After a year in water, the eastern boundary array was successfully serviced from *RV Pelagia* with NIOZ and U. Miami partners. One ADCP mooring was not recovered. This was in a high risk fishing region, and the implications for the array and for the equipment budget will be assessed next. The deep western boundary array will be serviced later in July 2015.

2. Analysis and Research

Progress has been made in implementing the Tracer Contour Inverse Method (TCIM) for providing estimates of subpolar gyre mixing and circulation using historical Argo float data. Interannual to decadal variability of subpolar ocean heat content has been shown to be dominated by convergence in the ocean heat transport, rather than gyre-integrated air-sea heat fluxes. The changes in heat transport into the gyre are connected to changes in Labrador Sea western boundary density. An analysis of the local and remote surface forcing on the AMOC variability at 26N using adjoint model data is complete, and shows subpolar heat fluxes dominate at interannual-decadal timescales.

3. Outreach and stakeholder engagement

UK OSNAP glider data are now relayed in real-time (via BODC) to the Royal Navy. We are regularly tweeting (@ukosnap), blogging (ukosnap.wordpress.com, www.o-snap.org/news-events/blog/) and posting animations (www.youtube.com/channel/UCWApV_3EUIgw4aEzfk76n0Q).

Overall progress:

Progress has been good overall. The new observations from the OSNAP array are accumulating, and work to analyse real-time glider observations are underway. Work on the adjoint model was delayed by the loss of the named post-doc, but the post is being recruited. Implementing the TCIM has proved to be challenging, but PIs are working with project partners to solve the issues. Analysis of the 2014 OSNAP CTD section has begun (synoptic detailed view of gyre and overturning circulation, heat and freshwater fluxes). UK OSNAP fully participates in the international programme through co-ordinated field work and research, and international planning. Holliday is the UK member of the OSNAP Scientific Steering Committee which is an internal committee that holds teleconferences every two months. UK OSNAP investigators will meet with the full OSNAP community in July 2015. International partners came to the UK PI meeting in April 2015. At the UK OSNAP project meeting in April 2015 we identified that our stakeholder engagement needs to be developed. We plan a workshop, to be held in Oxford in late 2015 or early 2016, targeting participants from Hadley Centre and Reading University. Holliday will explore how UK OSNAP can inform the fisheries advice/policy community through ICES.

Upcoming events:

Four papers are submitted or in press and likely to be published in the next 6 months (Holliday et al, JGR, multidecadal variability in eastern subpolar North Atlantic; Pillar et al, Science, Reconstructing recent Atlantic overturning from surface wind and buoyancy forcing; Sherwin et al, Ocean Science, Deep eddies stir the surface layers of the central Rockall Trough; Williams et al, J Climate, Mechanisms of heat content and thermocline change in the subtropical and subpolar North Atlantic). PIs will be speaking at in July 2015 at the RAPID/AMOC/OSNAP Open Science Meeting, and at the GAIC conference in Sept 2015 (www.gaic2015.org/).