

BIANNUAL ACHIEVEMENTS REPORT July 2016

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. Implementation of the OSNAP observing array

In summer 2016 (July-Aug), the UK parts of the OSNAP array are being serviced from UK ships. Some equipment in a high risk fishing area was not recovered (another slope current trawl-proof frame and ADCP: it was found 1km from deployment site and possibly inverted on the seabed) and we are considering additional Sea Glider observations for this boundary current. To address the fishing risk the lander has been redeployed at a deeper site. We are running gliders in a semi-operational mode and are not sustaining the planned observation programme on the Rockall-Hatton Plateau because of critical bottlenecks in the deployment logistics. Planning for array servicing in 2017 is in progress.

2. Analysis and Research

(i) A new method for estimating of subpolar gyre mixing and circulation using historical Argo float data is being implemented with encouraging results. (ii) Historical and OSNAP mooring data have given new estimates of the transport of overflow water in the eastern boundary (paper submitted) (iii) Glider and historical data are being analysed to quantify and understand the seasonal signal in transport. (iv) The subpolar MOC is estimated to be ~ 20 Sv based on the OSNAP CTD section in summer 2014 (paper submitted). (v) The OSNAP method to derive MOC and flux estimates from the array is nearly finalised (led by US and UK OSNAP investigators). (vi) UK OSNAP investigators have contributed review and early results to an overview paper (accepted in BAMS). (vii) New postdoc started work on adjoint modelling, investigating influences on MOC variability.

3. Outreach and stakeholder engagement

We are regularly tweeting (@ukosnap), blogging (ukosnap.wordpress.com, www.o-snap.org/news-events/blog/). Array servicing cruises (DY053, Cunningham Jun/Jul; DY054, Holliday, Jul/Aug) and are being used as an opportunity for filming and outreach. DY054 is taking an artist from Southampton Uni, and two US film-makers funded by US OSNAP to gather material for a new OSNAP AMOC website. The US film-makers will visit Liverpool after the cruise for material about the human impact of ocean circulation (NOC and Liverpool Uni).

4. Additional funds levered and related projects

EU Blue Action (funded by H2020-BG10). Extended Ellett Line and ACSIS (NERC, National Capability). EU H2020 programmes Atlas and AtlantOS fund O₂, pH, alkalinity and nutrient measurements on the RT array as part of the sustained Atlantic Observing System.

Overall progress:

Progress has been good overall. The new observations from the OSNAP array are being processed and analysed and the first papers are being submitted. A joint paper with international OSNAP colleagues has been submitted and more are planned. UK OSNAP participates in the international programme through co-ordinated field work, research and planning. Holliday is a member of the OSNAP Scientific Steering Committee, and Holliday and Cunningham are members of the OSNAP Data Products Working Group (defining OSNAP metrics and the method). UK OSNAP plan a second a joint meeting with NERC projects RAMOC and DYNAMOC in Nov 16 in order to promote interaction with the climate modelling community. The OSNAP report to the Programme Advisory Group was well received and prompted useful feedback.

Upcoming events:

Holliday is on the steering committee for a joint ACSIS-RAPID-OSNAP open science meeting in 2017.