

BIANNUAL ACHIEVEMENTS REPORT February 2017

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

Report completed by: N. P. Holliday, UK OSNAP Principal Investigator, nph@noc.ac.uk

Date: February 2017

Project Status: **Green** indicates that everything is on track.

Programme's key achievements & overall progress over last 6 months (Aug 16 - Jan 17)

1. Implementation of the OSNAP observing array: In July-Aug 2016, the UK Deep Western Boundary array was serviced. UK data from all our array components have been processed, quality controlled and submitted to BODC, and to the OSNAP Data Hub (Duke Uni, US) where the array products are being generated. Gliders are operating in "continuous presence" mode in the eastern boundary array; we have experienced ongoing logistical difficulties in maintaining this part of the array, but we are working with NERC and MARS to address the issues. Eastern component moorings will be serviced on RRS Discovery in May 2017 on the Extended Ellett Line cruise (DY078/079, PS Holliday).

2. Analysis and Research: (i) A new method for estimating of subpolar gyre mixing and circulation using historical Argo float data has been developed and testing with model output (two papers in prep). (ii) Historical and OSNAP mooring data have given new estimates of the transport of overflow water in the eastern boundary (published Deep-Sea Res) (iii) Glider and historical data are being analysed to quantify and understand seasonal signal in transport (in revision J. Geophys. Res Oc.). (iv) Subpolar overturning and gyre circulation estimated from high resolution OSNAP CTD sections in 2014 and 2016 (in revision, J. Geophys. Res Oc.). (v) OSNAP method to derive MOC and flux estimates from the array is finalised, array data from all partners submitted to international OSNAP data hub, and products are being compiled (Science or Nature paper in prep). (vi) Dynamics and forcing driving ocean heat and circulation changes in 1985-2010 as the subpolar gyre decelerated has been analysed (submitted J. Geophys. Res. Oc). (vii) Progress being made in developing adjoint modelling to investigate influences on MOC variability. (viii) We have begun investigating the contribution of temperature and salinity to density changes in the subpolar North Atlantic.

3. Outreach and stakeholder engagement: We are regularly tweeting (@ukosnap), blogging (ukosnap.wordpress.com, www.o-snap.org/newsevents/blog/). Footage collected on array servicing cruise (DY054, Holliday, Jul/Aug) is being edited for a US-led interactive website. In Nov 16 we hosted a joint meeting with NERC projects RAMOC and DYNAMOC to promote interaction with the climate modelling community.

Overall progress: Progress has been good overall. The new observations from the OSNAP array are being analysed and the first papers are being revised and published. A joint paper with international OSNAP colleagues has been published 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). 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 autumn 2017 <http://www.rapid.ac.uk/aor17/>.