

BIANNUAL ACHIEVEMENTS REPORT REQUEST – RESEARCH GRANTS

Reporting Period: Q4, 2019/20

Dear Colleague

Please find attached a template to report on the outcomes and impacts of the NERC Highlight Topic or Discovery Science Large grant for which you are the lead Principal Investigator. Please email your completed report to reporting@nerc.ukri.org.

Please provide narrative under the following headings:

- *Key achievements (please try to keep within 200 words each)*
- *Overall progress with the project (100-200 words as a guide)*
- *Any notable issues encountered (if any and remedial actions undertaken, if needed)*
- *Any newsworthy activity planned or known about in the next 6-9 months*

This reporting process is intended to be high-level, light touch and flexible. Please try to be concise. Ideally, the whole report should not exceed one side.

Between reports, if there are any significant good news stories, delays or issues affecting the grant, please let us know as soon as possible at researchgrants@nerc.ukri.org.

If you require further help in completing the report, please do not hesitate to contact us reporting@nerc.ukri.org.

Research Grant Reference	NE/K010875/1, NE/K010875/2, NE/T00858X/1, NE/T00858X/2 (NOC) NE/K010700/1, NE/T008938/1 (SAMS)		
Grant Title	The UK Overturning in the Subpolar North Atlantic Program (UK-OSNAP, to June 2019) and UK-OSNAP-Decade: 10 years of observing and understanding the overturning circulation in the subpolar North Atlantic (July 19 onwards)		
Completed by	Penny Holliday, NOC	Date	1 May 2020

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Key achievements
<p>- 6 new papers published: <i>Huthnance et al. 2020</i>, Oceanic density/pressure gradients and slope currents. <i>Journal of Physical Oceanography</i>. <i>Johnson et al., 2020</i>, Significance of climate indices to benthic conditions across the northern North Atlantic and adjacent shelf seas, <i>Frontiers in Marine Science</i>. <i>Holliday et al. 2020</i> Ocean circulation causes the largest freshening event for 120 years in eastern subpolar North Atlantic. <i>Nature Communications</i>. <i>Le Bras et al 2020</i> Rapid export of waters formed by convection near the Irminger Sea's western boundary. <i>Geophysical Research Letters</i>. <i>Benetti et al. 2019</i> Sources and distribution of fresh water around Cape Farewell in 2014. <i>Journal of Geophysical Research: Oceans</i>. <i>González-Pola et al. 2019</i> The ICES Working Group on Oceanic Hydrography: A Bridge From In-situ Sampling to the Remote Autonomous Observation Era. <i>Frontiers in Marine Science</i></p> <p>- 3 new papers in review</p> <ul style="list-style-type: none"> - UK OSNAP presentations at AGU Ocean Sciences conference in Feb 2020 - OSNAP project meeting at Scripps Inst Oceanography in Feb 2020, chaired by Holliday - International OSNAP community is refining the OSNAP method and working on the second paper of the OSNAP array time series of overturning circulation and heat and freshwater transport estimates. - Ongoing CLASS (National Capability) glider missions are providing data for Eastern Boundary Array. The missions have been redesigned so that they sample the Northwest European Continental Slope Current, a feature for which we have previously had almost no data return from UK OSNAP ADCP landers. - 3 proposals involving PIs from the UK OSNAP team submitted to NERC Changing North Atlantic Ocean call (November 19) to build on UK OSNAP data, results and knowledge. - The EU project iAtlantic is now up and running, linking OSNAP with groups in South Africa and Argentina operating SAMOC (the South Atlantic Meridional Overturning Circulation array)

Overall progress
- Overall progress is very good for this period, as demonstrated by continuing publication of high quality papers

Notable issues (if any)
- Since March 2020 significant uncertainty has developed around field work. All OSNAP international partners had cruises planned for servicing OSNAP moorings in summer 2020. The COVID-19 crisis has forced the suspension of all cruise programmes (including UK's NMF). We do not know yet when we will be able to service the UK moorings (in 2020 or 2021), and there is a risk to data and instruments associated with the postponement of cruises (damage to moorings, battery failure). The risk increases with longer postponement. Loss of data would increase the uncertainty associated with the OSNAP time series of overturning, heat and freshwater fluxes. Loss of instruments would impact our ability to collect future data unless resources were found to replace them.

Upcoming newsworthy activities