Met Office interest in collaboration with "The changing North Atlantic ocean and its impact on climate"

The Met Office is interested in collaborating with projects investigating the North Atlantic circulation and its impacts on climate, particularly in understanding ocean processes affecting the circulation and how these are represented in climate models, and on impacts of changing circulation.

We are keen to explore collaboration that is aligned with or complementary to our current programmes. Such collaboration has the potential to bring resources in kind to proposals, as well as potential pathways to rapid impact, e.g. on climate model development.

Current relevant research interests at the Met Office:

Relevant to Challenge 1:

- Influence of model resolution on AMOC simulation and projections
- Evaluation of model simulations of the RAPID and OSNAP sections
- Location of, and processes controlling, density transformations and sinking in the North Atlantic
- Basin-scale heat and fresh water transports and storage, their role in large scale climate dynamics and their use in climate model evaluation.
- Climate model development and evaluation at the limits of current ocean resolution (order 1/4 degree) and beyond (currently 1/12 degree)
- Improved representation of sill overflows and boundary currents in ocean climate models
- Topographic steering of flow in the North Atlantic
- Assimilation of high-density observations into high-resolution ocean models, for both real time and reanalysis purposes.
- Seasonal and decadal climate prediction in the North Atlantic sector (and wider)

Relevant to Challenge 2:

- Basin-scale heat and fresh water transports and storage, their role in large scale climate dynamics and their use in climate model evaluation.
- Quantifying and understanding North Atlantic Ocean variability of the past few decades, and its role in climate variability, through ocean reanalyses and numerical experimentation. Putting variability observed by RAPID, OSNAP and related programmes into a wider spatial and temporal context, and understanding its causes.
- Seasonal and decadal climate prediction in the North Atlantic sector (and wider)

We welcome ideas for collaboration in the above areas, but also in potential new scientific areas that are consistent with our overall research programmes.

Resources:

Climate models, with a range of resolutions, have recently been developed by the UK modelling community for submission to the CMIP6 comparison process*. Output from a range of CMIP6 experiments using these models is currently being transferred to the CMIP6 data portal, where it will be freely and openly available. Some variables will not be available through CMIP6, but may be available through collaboration with the modelling scientists in the Met Office and/or the NERC-Met Office UKESM Core Group.

Comparisons with the Met Office global ocean reanalysis, GloSea5, could also be beneficial. Studies to date have shown promising results in comparisons with observations from the RAPID and OSNAP sections, though there are more detailed analyses which could be performed. The data from the GloSea5 reanalysis can be obtained through collaboration with the Met Office. It is intended that a new version of the reanalysis, to be run in the first half of 2020, will be made more openly available to the community during the second half of 2020.

Contact:

If you are interested in exploring ideas for collaboration but don't know the best contact, please contact Richard Wood (richard.wood@metoffice.gov.uk) or Laura Jackson (laura.jackson@metoffice.gov.uk), who will be able to put you in touch with the right people.

*The 'physical' atmosphere-ocean-sea ice-land surface model HadGEM3-GC3.1 has been run at two resolutions (120km atmosphere/1° ocean and 60km atmosphere, 0.25° ocean) for a wide suite of CMIP6 experiments. The Met Office-NERC Earth System Model UKESM1 adds a range of biogeochemical processes to the lower resolution version of GC3.1 and has run a large suite of CMIP6 experiments. Additionally a suite of GC3.1-based models have been run at a wider range of resolutions resolutions (up to 1/12° ocean) for a more restricted set of experiments, as part of the HighResMIP project.