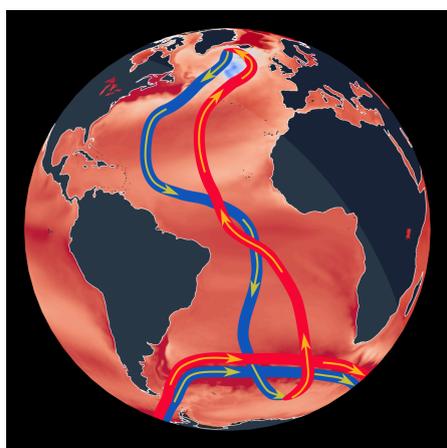


Predict AMOC weakening from mean state observables

Proposer: Prof. Katinka Bellomo

The Atlantic Meridional Overturning Circulation (AMOC) is a global system of ocean currents, which plays an outstanding role in regulating the Earth's climate. AMOC has been weakening over the last millennium, and is projected to further weaken in the 21st century due to increased ocean stratification caused by anthropogenic greenhouse gas emissions. However, there is large uncertainty in the rate, amount and a possible shutdown of AMOC weakening. This project aims at leveraging observables of the mean climate to predict the future AMOC weakening, building on the existing correlation between mean state variables and future projections in climate models. The Ph.D. candidate will apply AI to leverage existing datasets and build predictive models of AMOC characteristics in future projections. The Ph.D. candidate will analyze observational datasets (satellite- and surface-based), as well as model simulations from the Coupled Model Intercomparison Project (CMIP) and other international projects. They will use these datasets and apply statistical and machine learning algorithms to infer robust and physically grounded relationships to deliver “observational constraints” on future climate change projections, thereby contributing to reducing uncertainty in the estimates of climate change impacts. It is expected that the Ph.D. candidate will develop robust analytical and modeling skills ranging from climate science to machine learning techniques.



AMOC in a warming climate. Credit: Met Office.

Interested applicants should ideally have a background in the following areas: climate science, meteorology or oceanography, physics, geophysics, engineering or mathematics. Prior programming experience is an asset. This position is based in the Department of Geosciences of the University of Padova (Italy) and is funded by the FIS Starting grant ACTOR (AMOC resilience during warm climate states and implications for 21st-Century climate tipping points).

Related funding: ACTOR - FIS project (Bellomo)