

## AMOC in a changing climate: yesterday is history, tomorrow is a mystery

The Atlantic Meridional Overturning Circulation (AMOC) plays a key role in climate via its transport of heat, freshwater, and carbon. Links between changes in AMOC and climate around the North Atlantic and on a global scale have been proposed. Yet, the mechanisms controlling the AMOC strength, variability and response to climate change remain poorly understood. Given the significant uncertainty in the current generation of models regarding AMOC, its fate and its influence on climate, several mysteries remain unsolved. I will review theoretical aspects related to AMOC and its influence on climate, especially ocean heat uptake, thermohaline sea level rise and climate sensitivity. I will discuss the uncertainties in our current understanding and modelling of the circulation and present possible ways forward, focusing on future projections of AMOC.