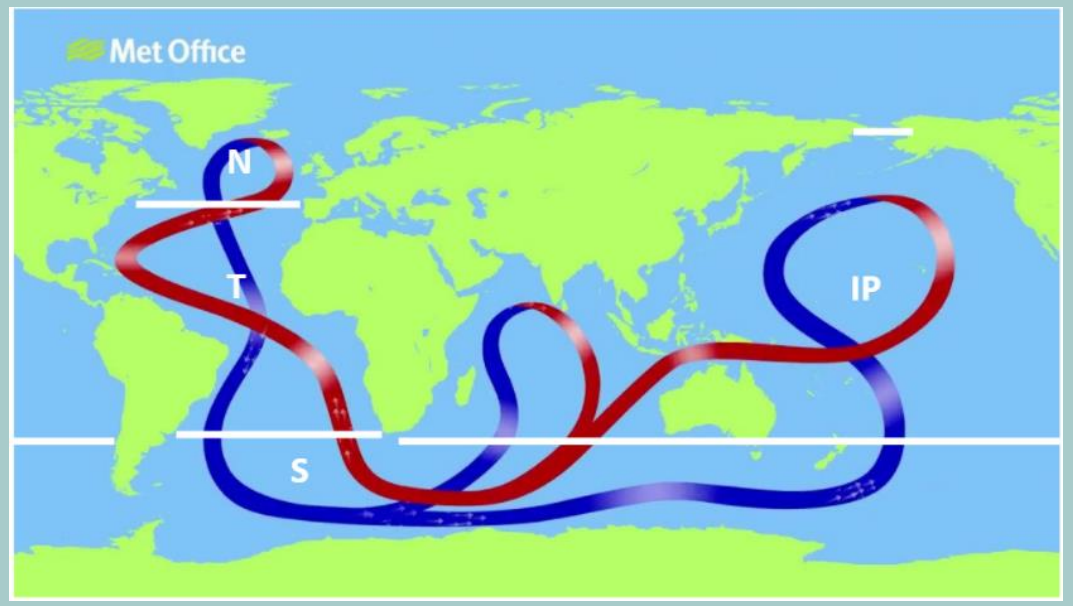
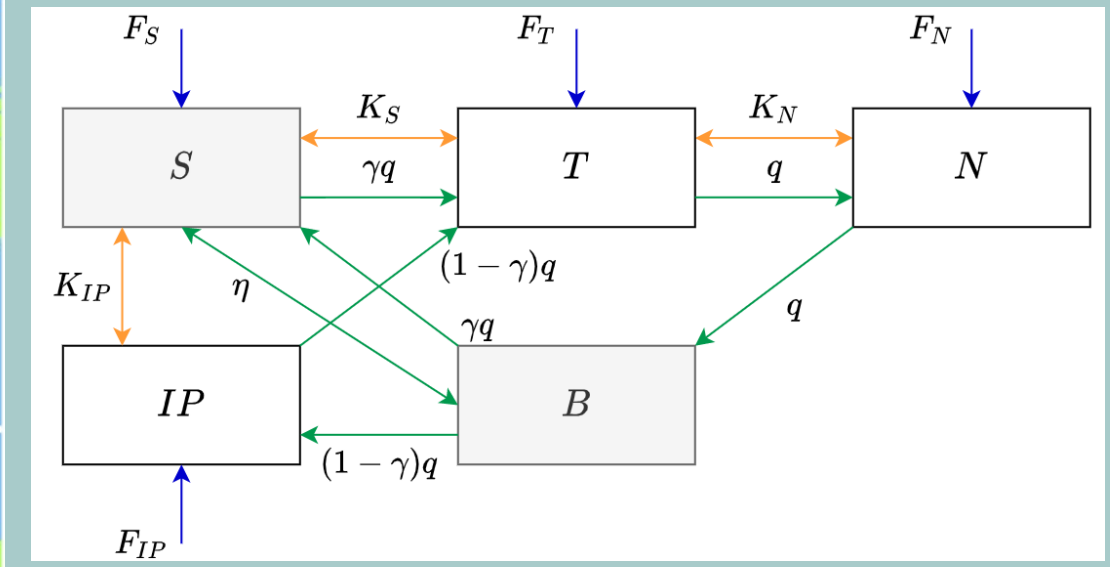
Stochastic data adapted Atlantic Meridional Overturning Circulation box models

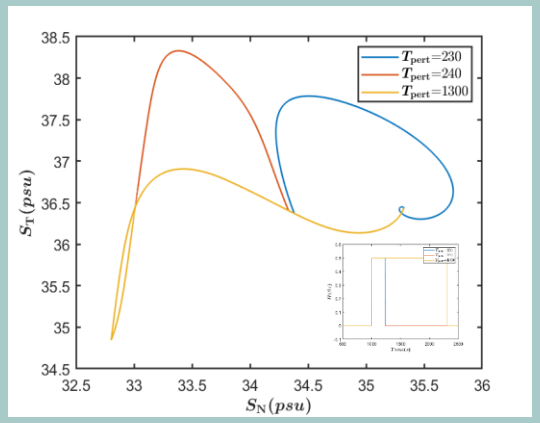
Ruth Chapman, Supervised by Peter Ashwin and Richard Wood (rc686@exeter.ac.uk)



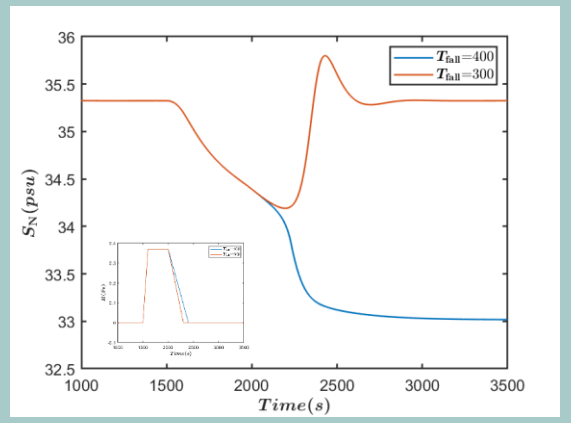


Top Right: A schematic of the five box model, details in Wood et.al. (2019). S- Southern Ocean, T- Tropical Thermocline, N- Northern Atlantic, IP- Indo-Pacific Ocean, B- Bottom Waters. Eta is a mixing parameter, q is the strength of the circulation, K are wind fluxes and F are freshwater fluxes.

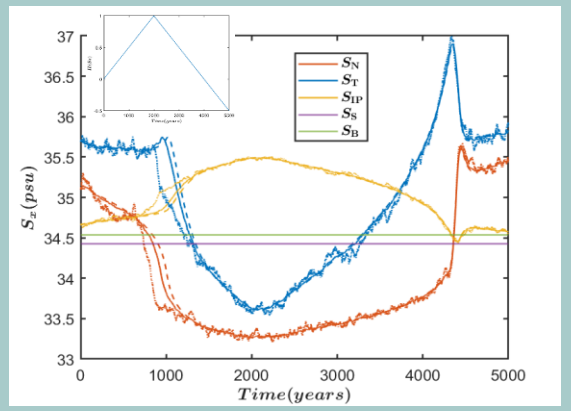
Above Left: A map of the current of the AMOC in the 'on' state, with the box boundaries draw on. The AMOC is able to tip into a different stable state known as the 'off state' where the current is reversed (in this model).



Bifurcation Tipping with a top-hat hosing function



Rate-dependent tipping with a small change in T_fall



Left: Noise induced tipping with hosing and variable noise amplitudes (estimated from FAMOUS runs)