

# Role of

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We investigate the role of three key modes of variability, the North Atlantic Oscillation, El-Niño Southern Oscillation and Southern Annular Mode as pacemakers of climate variability over the instrumental period. This is based on a particle filter data-assimilation technique that constrains the model to the observed variability in a global climate model without the use of nudging, producing a near free running model simulation with similar modes of variability to that which actually occurred. The assimilated model is closer to annual observations over many areas of the globe, in particular the tropics, the north Atlantic and Europe. This presentation focuses on the North Atlantic particularly.

The decadal evolution of simulated climate is closer to observations over much of the northern extra-tropics, can explain long-term trends in the Asian winter monsoon and reconciles simulated volcanic cooling with that observed. The North Atlantic ocean sea surface temperature, and overturning show improved agreement with observations. The results suggest where skilful predictions of these modes may lead to potential skill in decadal predictions over the Atlantic sector.

We will further show briefly constrained predictions for European temperature and precipitation based on observed trends, with and without explicitly accounting for the North Atlantic Oscillation, and discuss merging with initialized predictions.