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Atlantic multi-decadal variability and the role of stratosphere-troposphere

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Ocean and atmosphere in the North Atlantic sector exhibited pronounced multi-decadal variations during the instrumental period. Reanalysis data indicate that the stratospheric polar vortex also under went similar variations. In particular, the warm phase of the Atlantic multi-decadal variability (AMV) is linked to a weakening of the stratospheric polar vortex and a negative North Atlantic Oscillation. Recent modelling and observational studies provide evidence that the extra-tropical sea surface temperature (SST) changes were not only driven by past atmospheric variability, but also contributed actively to drive the atmospheric variability and that stratosphere-troposphere interaction was a key element. I will provide a review of current understanding of ocean-atmosphere interaction in the North Atlantic Sector and the role of stratosphere-troposphere interaction. I will highlight were there is a need for more research to reduce uncertainties. For example, the factors that lead to the simulated differences in the atmospheric response to North Atlantic SST need to be better understood. I will discuss how better representation of ocean-atmosphere interaction in the North Atlantic sector can lead to improved simulation and predictions of climate.