



## **Decadal scale stratosphere-troposphere coupling in MPI-ESM and CMCC-CMS**

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A potential role of the stratosphere in decadal prediction was recently proposed by Manzini et al. (2012). Based on composite analyses with the output of a 260 year control run of one particular coupled climate model (CMCC-CMS), Manzini et al. (2012) established a connection -via the troposphere- of long lasting occurrences O[20 yrs] of weak and strong polar vortices in the stratosphere to anomalous surface properties such as temperature or sea level pressure. Furthermore, a lead-lag correlation analysis revealed weak but significant correlation between the polar vortex and the Atlantic MOC when the MOC lags behind the vortex by 3-4 yrs, indicative of a downward atmosphere to ocean coupling.

Here, we extend the investigation of the stratosphere-troposphere coupling by applying correlation analysis instead of composites to recently available, longer time series of CMCC-CMS data. Moreover, we add another suite of experiments to the analysis that is based on the Hamburg Max-Planck-Institute Earth System Model (MPI-ESM). By adding control experiments from both the coarse (MPI-ESM-LR) and the medium (MPI-ESM-MR) resolution Hamburg models that are part of the CMIP5 effort (as is CMCC-CMS), we are able to identify to what extent the proposed decadal connections are robust features among the models and to advance our understanding of limitations in the individual model set-ups.

Manzini E., Cagnazzo C., Fogli P.G., Bellucci A., Müller W. A., (2012). Stratosphere-troposphere coupling at inter-decadal time scales: Implications for the North Atlantic Ocean. *Geophysical Research Letters* 39, DOI:10.1029/2011GL050771.