



Simulated Atmospheric Response to the 2015 North Atlantic SST Cold Blob

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In the summer of 2015 central Europe experienced a major heat wave which in the months before was preceded by the development of anomalously cold sea surface temperatures in the northern North Atlantic. A previous study has shown that the cold ocean anomaly preceded a pronounced southward deviation of the Jet Stream path in early June which favoured the development of the heat wave over central Europe. However, whether the cold SST anomaly in the North Atlantic was the cause of the change in the atmospheric circulation is not yet clear. This study aims to further investigate the connection between the Atlantic cold blob of 2015 and the heat wave over central Europe through the use of a state-of-the-art coupled climate model, HadGEM3. The coupled model is initialized with 3D anomalies for temperature and salinity, obtained from an ocean-only hindcast run for the 1958 to 2016 period. The ocean-only model simulates the cold blob event well. Also, it is nearly the same model (NEMO ORCA025) as the ocean component of HadGEM3, implying that using ORCA025 T and S field minimizes the adjustment/initialisation shock compared to assimilating observations. Two different model ensembles are generated: 1) Applying the initial temperature and salinity anomalies globally (GLOBAL) and 2) applying the initial temperature and salinity anomalies only to the North Atlantic (ATLANTIC). In both GLOBAL and ATLANTIC the application of the ocean anomalies leads to a heat wave over central Europe for the ensemble mean. The GLOBAL ensemble shows a stronger signal for the central European heat wave than ATLANTIC. This suggests that remote signals (i.e. from outside the North Atlantic) likely helped to enhance the heat wave. Compared to observations, our model results all favour a heat wave that is shifted too far east. Further investigations of the mechanisms behind the heat wave as well as some of the difficulties in simulating the correct location of the heat wave will be discussed.