

ENSO-NAO interactions in an atmospheric model

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The existence of an extratropical ENSO signal in the stratosphere has been demonstrated in a number of observational and modelling studies. Filling of the polar cyclone and a weakening of the polar night jet during El Nino is likely due to an increase in the level of stratospheric wave driving by Rossby waves from the troposphere. A number of recent studies have looked at the effect of the stratosphere on the troposphere with a weakening of the polar night jet being associated with a surface response resembling the negative phase of the North Atlantic Oscillation. Consistent with these studies, recent observational results also indicate a link between El Nino and cold late winter European surface temperature in some but not all events.

Here we present results from a 4-member ensemble of experiments using an extended (60-level) version of the Hadley Centre climate model, HadGAM1. The model uses observed sea surface temperatures at its lower boundary and has been run from 1960 to 2002. A composite of El Nino events show both an infilling of the winter polar vortex and a negative January-February NAO signal, indicating a potential source of seasonal predictability for Europe in winter.