

Background state-dependence of atmospheric responses to SST anomalies: comparing winter and summer.

Stephen I. Thomson and Geoffrey K. Vallis

Department of Mathematics, University of Exeter, United Kingdom

One potential source of seasonal predictability for Europe is through the impact of SST anomalies on the atmosphere. However, the atmospheric response to SST anomalies is notoriously difficult to simulate, and may be sensitive to model details and biases, particularly biases in climatological jet position.

Many previous studies have looked at the dependence of models' responses to anomalous SST on the background wind field, normally by comparing the responses in different winter months, or by comparing responses across different models.

In this work, we look at how a single idealised model's response to SST anomalies depends on the background wind using two methods. First, by comparing the response to a given SST anomaly in winter and in summer, with the different seasons providing different background wind fields. And second, by doing the same experiments with two different configurations of continents and topography, as these configurations give rise to different background wind fields within the same season.

Our results indicate that the model responds very differently to SST anomalies in winter and summer, and that eddy processes might be responsible. In addition, dependences on the background wind field appear to be different in the Atlantic and Pacific sectors. Implications for European seasonal predictability in summer and winter will be discussed.