



A multi-model comparison of the climate impacts of a multidecadal change in Atlantic sea surface temperatures

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The nineteenth and twentieth centuries saw marked multidecadal variations in the climate of both North America and western Europe. During this period prominent multidecadal basin-scale temperature variations were also observed in the North Atlantic Ocean. In a 2005 Science paper we presented evidence that such basin-scale changes in Atlantic sea surface temperatures (SST) were an important driver of some of these multidecadal variations in climate, particularly during boreal summer. As part of the EU Framework 6 DYNAMITE project we have expanded this study by carrying out new experiments to investigate the sensitivity of our results to both specific aspects of the SST pattern and the choice of atmospheric General Circulation Model.

We find that four of the five models employed display similar boreal summer impacts over North America to those seen in our previous experiments; a region of low pressure and a warming of the North American continent - both in-line with observations. However, there appears to be a less clear impact on North American rainfall. We also

find a number significant impacts in other regions, for example a pattern of increased in rainfall over Central America and reduced rainfall over the northern parts of South America. Whilst qualitatively similar, the precise magnitude of this pattern varies significantly between models.

We conclude that the large scale boreal summer response in MSLP and Temperature over North America is largely independent of both the model used and the small scale structure of the Atlantic SST pattern. But that the magnitude of the impact on rainfall over the Americas is subject to a large degree of model uncertainty.