

Storm track and jet variability from a wave mean flow perspective

Prof. Maarten Ambaum, University of Reading, UK

Abstract:

The storm tracks and the jets are in a complex equilibrium of mutual interactions mediated by turbulent heat and momentum fluxes. This is not a simple system and it indeed presents one of the key uncertainties in climate prediction, especially at the regional scale. One way forward is to reduce the system to its most basic components and see what this tells us about the more complex and more complete system. We have been experimenting with a particular two dimensional relaxation oscillator as an archetypal model for storm track variability. The theoretical basis lies in established theories of wave-mean flow interaction. The model suggests a completely new way of analysing the climate of the midlatitudes. It also suggests several consequences for the full climate, which can be predicted and tested in comprehensive models and data. Some of these consequences are counterintuitive (related to effects such as eddy saturation and frictional control) and they inform a wide range of issues from the current debate on arctic amplification to model uncertainties in sub-grid drag.