Geophysical Research Abstracts
Vol. 16, EGU2014-7737-1, 2014
EGU General Assembly 2014

The relation of objectively detected Rossby-Wave-Trains and extratropical cyclones in the North Atlantic

Mareike Schuster (1), Ingo Kirchner (1), Philip Lorenz (1), Uwe Ulbrich (1), and Andreas Will (2)

(1) Institute for Meteorology, Freie Universität Berlin, Berlin, Germany, (2) Umwelmeteorologie, BTU Cottbus, Cottbus, Germany

Our current interest and topic of this poster is the relation of Rossby-Wave-Trains (RWTs) and cyclones in the North Atlantic. Northern Hemisphere extra-tropical cyclones, especially those systems that occur in winter, are known to have high socioeconomic impacts, e.g. through high windspeed and large amounts of precipitation. Recently, a specific interest in Rossby-Wave-Trains has arisen. Long lived RWTs have been shown to be precursors for extreme events and they may impact the predictability of mid-latitude weather systems. We therefore apply automated schemes for the identification of RWTs and cyclones, respectively and relate their characteristics, with the focus of the impact for European climate. Evaluating reanalysis and model data of historical runs, we aim to identify possible spatio-temporal connections between these objectively identified RWTs and cyclones.

As our project “MesoTel”, which is presented here, is part of a decadal prediction initiative from the German Federal Ministry of Education and Research called “MiKlip”, we are additionally investigating the decadal variability of RWTs & cyclones within reanalyses and MiKlip simulations. Our long-term goal is to improve the predictability of seasonal means for Europe through a Two-Way-Nested (TWN) model setup.

For this TWN model setup, the regional climate model COSMO-CLM (CCLM) is nested into the atmosphere-ocean general circulation model ECHAM6/MPI-OM (MPI-ESM) in order to investigate the feedback of the meso-scales on the large scales and vice versa. Focus is laid on the development and propagation of synoptic systems (e.g. Rossby Wave Trains and cyclones) that are affecting Europe. The Two-Way-Nested region, thus the CCLM domain, covers Central America and the North Atlantic (CANA) and therefore includes the Gulf stream region, whose prevalent strong meridional SST gradients favor the development of perturbations which then propagate downstream, commonly develop into extra-tropical cyclones and strike Europe. Finally, the possibly identified relationship between RWTs and cyclones shall be explored in Two-Way-Nested simulations.