Introduction
Climate factors, primarily temperature and precipitation, interact with geology, geomorphology and soil characteristics in determining the type and productivity of woodlands and forests. Theses climate and soil factors determine many of the species and community patterns in our semi-natural woods and they strongly influence the choice of species for wood production. As climate changes, so the tree and woodland cover will change.

Changes in Irish Native Forests due to Climate Change
Irish forestry is threatened by the same climate change that is affecting the atmosphere, and providing biomass for industry and power generation, are facing new pest difficulties as climate changes.

Climate Modeling
ICARUS-Weather Research and Forecasting Advanced Regional Weather Model (WRF-ARW) – IMPACT Wales – Ireland Project
The model currently under development in Maynooth’s Climatic Research Centre is the National Center for Atmospheric Research (NCAR) Weather Research and Forecasting model (WRF-ARW).

For the first phase of the IMPACT project, the model was forced at the boundaries by ECMWF-Intermediate 0.5 degree 1989-2005 dataset. This is the ECMWF High Resolution Reanalysis data (uses a mix of observations and model output data). The output from the WRF model is at a resolution of 10 km. The intention is to compare WRF’s 1993-2005 output with observed climate data for the same period covering the same domain (Ireland/Wales). This gives information on the bias of the WRF model. This is an important step when determining how well the model is performing prior to any full scale model runs of 20th century (1961-1990) and future (2021-2050) datasets.

Once the model bias has been determined and calibrated, the intention then, is to use the NCAR Earth System Grid CCSM3 SRES A2 Atmospheric-Ocean General Circulation Model (AOGCM) CCSM3 data. This is using GCM data to force the lateral boundary of the WRF model in a Regional Climate Model (RCM) mode, using both 1961-1990 and 2021-2050 data. CCSM has already been evaluated using WRF as a RCM in other research.

The first phase has been completed. The model physics that have least bias in regard to observational data at the same temporal scale have been determined. The WRF model output covers both Wales and Ireland at a resolution of 10 km grid cells. WRF output model temperature 1989 – 2000 has been compared with at the same domain (Ireland/Wales). This gives information on the bias of the WRF model. This is an important step when determining how well the model is performing prior to any full scale model runs of 20th century (1961-1990) and future (2021-2050) datasets.

Conclusions
The WRF_ARW regional climate downscaling simulations have been performed using a mesoscale model WRF with initial boundary conditions driven by ECMWF-intermediate simulations data for the period 1989 to 2005. We have compared the WRF_ARW output against University of Ulster weather station data for the years 1989 and 1990. The ECMWF drives WRF_ARW output represents reasonably well the synoptic pattern of observed temperature data. The model falls to capture the lower end of the temperature scale seen in the observed data. The observed data came from the University of Ulster weather station. This is data that has not been tested for homogeneity and as such will also have some defects possibly with site location and specified recording times. Overall, the parameterization within the model performs very well and gives confidence in its ability to undertake the second phase of the project, to use the GCM CCSM2 2021-2050 data for future climate predictions.

Literature cited

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