EMS Annual Meeting Abstracts
Vol. 15, EMS2018-5, 2018

Met Éireann high resolution reanalysis for Ireland

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The Irish Meteorological Service, Met Éireann, has carried out a 35-year very
high resolution (2.5 km horizontal grid) regional climate reanalysis for Ireland spanning the period 1981-2015 using the shared ALADIN-HIRLAM numerical weather prediction system. Here we provide an overview of the reanalysis, called MÉRA, as well as analysis of surface parameters including screen level temperature, 10m wind speeds, mean sea-level pressure (MSLP), soil temperatures, soil moisture and 24h rainfall accumulations. Extremes of precipitation and winds are also analysed. The quality of the 3-D variational (3DVar) data assimilation used in the reanalysis is also assessed. Analysis shows that it takes almost 12 months to spin up the deep soil in terms of moisture, justifying the choice of running year-long spin up periods.

Overall, the model performed consistently over the 35-year time period. Small biases were found in screen-level temperatures, MSLP and 10m wind speed. Soil temperatures are well represented by the model. 24 h accumulations of precipitation generally exhibit a small positive bias of 1mm per day and negative biases over mountains due to a mismatch between the model orography and the geography of the region. Comparisons with the ERA-Interim and UERRA reanalysis datasets show that MÉRA provides a high-quality reconstruction of recent Irish climate and benefits from the use of a very high resolution grid, in particular in relation to wind and precipitation extremes.

This dataset is the first of its kind for Ireland and is now publically available and currently in use by 100s of researchers in Ireland and further afield.