



Towards a Definitive Historical High-Resolution Climate Dataset for Ireland – Promoting Climate Research in Ireland.

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There is strong and constant demand from various sectors (research, industry and government) for long-term, high-resolution (both temporal and spatial), gridded climate datasets. Such datasets are invaluable aids to studies in observed climate change trends and variability. Additionally, they have potential application to many other diverse areas of interest – agriculture, hydrology, renewable energy (wind, wave and solar), public health and socio-economic planning. The Irish Centre for High-End Computing (ICHEC) has recently performed two high-resolution simulations of the Irish Climate on their supercomputer, Fionn. The simulations were achieved with the Regional Climate Models COSMO-CLM5 and WRF v3.7.1 at maximum resolutions of 1.5 km and 2 km respectively. The datasets produced contain both hourly and daily outputs for an array of sub-surface, surface and atmospheric fields for the entire 36 year period 1981-2016. Additionally, the Irish Meteorological Service, Met Éireann, has recently completed a 2.5 km resolution reanalysis (MÉRA) for the period 1981-2015 using the ALADIN-HIRLAM numerical weather prediction system. MÉRA differs somewhat from the ICHEC simulations since it involves an additional data assimilation component. In this work, we give a full description of the climate variables available and their potential application. We present preliminary analyses that evaluate the relative skill at various scales for a number of the climate variables in each dataset (e.g. surface temperature minimum/maximum and precipitation) and attribute uncertainty estimates to each. The observational datasets (station, gridded and satellite) used to aid these analyses are described and the methods used are discussed. Recommendations (based on these analyses) as to which dataset provides a “best” description for each climate variable are given and details outlining the future availability of the data are provided. Finally, we discuss ongoing work and collaborations that are aimed at the production of high quality gridded datasets of climate indices and derived products for use in various climate and agricultural applications.