Recent Advances in the Development of a Historical (1981 – 2016) Climate Dataset for Ireland

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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 resolutions of 1.5km and 2km, respectively. Four other simulations that cover much of Western Europe and the North Atlantic Ocean, at resolutions of 6km and 18km, were also completed. Additionally, the Irish Meteorological Service, Met Éireann, has recently completed a 2.5km resolution reanalysis (MÉRA) using the ALADIN-HIRLAM numerical weather prediction system – MÉRA differs somewhat from the ICHEC simulations since it involves an additional data assimilation component. All the datasets produced contain both hourly and daily outputs for an array of sub-surface (where appropriate), surface and atmospheric fields for the entire 36-year period 1981-2016. Here, we give a full description of the available climate variables and their potential application. We present analyses that evaluate the relative skill at various scales for a number of the climate variables in each dataset and attribute uncertainty estimates to each. The observational datasets (station, gridded and satellite) used to aid in these analyses are described and the methods used are discussed. Recommendations as to which model 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 aimed at the production of long-term, high-resolution (temporal and spatial) gridded climate datasets. Such datasets are invaluable aids to studies in observed climate change trends and variability and have potential application to many other diverse areas of interest – agriculture, hydrology and renewable energy, for instance.