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Radiation and cloud verification using the MÉRA high resolution regional reanalysis data set

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The Irish Meteorological Service, Met Éireann, has produced a 35-year high resolution reanalysis data set, for a domain covering Ireland, the UK and northern France, using the HARMONIE-AROME numerical weather prediction model. Here we present an analysis of the radiation and cloud outputs from this reanalysis data set including comparisons to radiation measurements and MSG cloud physical properties products.

We use measured shortwave (SW) fluxes to verify modelled clouds, which is an improved method of cloud verification compared to the traditional method of using synoptic surface observations. In the later, only cloud cover is verified whereas downwelling SW fluxes are an indirect measure of cloud water load and cloud micro-physical properties. In addition, we used the clear sky index (CSI) as a metric for SW flux and cloud verification (CSI is the global SW radiation normalised by the clear sky downwelling SW radiation).

As well as the default radiation scheme available in the cycle of HARMONIE-AROME used for the reanalysis, experiments involving the cloud inhomogeneity factor and the SW cloud optical properties parametrization were carried out and analysed.