

6.4 OPERATIONAL SOLAR MONITORING FOR IMPROVING THE HOMOGENEITY OF THE EUROPEAN RADAR NETWORK

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Online solar monitoring is an efficient method for monitoring antenna pointing, receiver stability, the balance between the polarization channels and several other properties of a weather radar. The method uses solar interferences observed during operational radar measurements and hence requires neither stopping of measurements nor dedicated measurement tasks. The solar method has already been taken into use by numerous national weather services in Europe, Canada, Australia and South Africa, and its operational use has proven to be highly effective in reducing radar downtimes, in focussing maintenance activities, and in keeping radars calibrated.

Since 2017 OPERA, the weather radar project of Eumetnet, has provided solar monitoring services to its members. The solar hit detection is done at the Eumetnet OPERA Data Centre, Odyssey, which collects volume data from 160 radars and produces a European wide composite at every 15 minutes. During the pre-processing of data, solar hits are detected and stored to files. Analysis of the solar hit files is performed at the Finnish Meteorological Institute, at present on a monthly basis.

The OPERA radar network is not homogeneous; the radar types, properties, and operation modes vary a lot. Hence the amount of solar hits detected daily varies from a few hits to about 100 solar hits daily. Some radars provide sufficient number of observations for a daily analysis and we obtain a full set of results (solar flux, antenna biases, and widths); in some cases solar hits need to be collected for up to one month before results are obtained and we only can provide an estimate for the antenna pointing biases. At present, we are able to get monthly pointing results from close to 90 radars, and results on pointing and solar flux from about 60 radars. In some cases the solar fluxes are still on an arbitrary scale, because all required metadata (e.g. radar constant, receiver band width) are not supplied with the data.

Here we show results of the work and discuss the benefits of the monitoring for improving homogeneity of the network and the quality of the continental scale composites.
