



Operational Uses for new Point Rainfall Forecasts

Timothy Hewson (1), Fatima Pilloso (1,2), and Axel Bonet (1)

(1) ECMWF, Forecast department, Reading, United Kingdom (tim.hewson@ecmwf.int), (2) University of Reading, Reading, United Kingdom (fatima.pillosu@ecmwf.int)

After presenting a model output post-processing idea in the final of the Harry Otten Prize for Innovation in Meteorology at EMS in Sofia in 2015, ECMWF (the European Centre for Medium Range Weather Forecasts) began work on bringing this idea to fruition. After overcoming many technical hurdles this culminated, in April 2019, in new real-time products being incorporated into an ECMWF web-based interactive forecasting system, called ecCharts. The products are referred to as “Point Rainfall”, whilst the post-processing suite is called “ecPoint”.

The aim of the Point Rainfall is to deliver, to forecasters, global calibrated probabilistic forecasts of rainfall amounts, on the ECMWF ensemble (ENS) grid, that represent rain gauge measurements assumed to be randomly located within each gridbox. This contrasts with the raw ENS, which delivers forecasts of rainfall averaged over the gridbox. Currently Point Rainfall output is for overlapping 12h periods up to day 10. There are two reasons why Point Rainfall and raw ENS forecasts may differ: (i) sub-grid variability in totals and (ii) the raw ENS gridbox forecasts are biased. Sub grid variability tends to be highest in convective situations, whilst biases also vary according to the local gridbox weather type. The Point Rainfall is calibrated to account for differences in (i) and (ii) that arise in different weather situations. The above features of the point rainfall computation will be briefly discussed, highlighting the key features of the novel calibration approach used that made the above tractable.

The new products consist of probabilities in % and exceedance thresholds in mm, displayed on the basis of user-defined values of, respectively, a value to exceed (in mm), or a percentile (1..99). These products will be illustrated, and compared with equivalent products from the raw ENS. Then the presentation will show, using case studies, how Point Rainfall forecasts can be used to add value in different forecasting scenarios, such as flash flood prediction or predicting the probability of dry weather. Global verification statistics will be used to show that success in case study situations is not fortuitous, but representative of the overall performance of ecPoint. Nevertheless, there are some limitations for forecasters to be aware of. To complete the picture these will also be described.