Geophysical Research Abstracts
Vol. 20, EGU2018-9362, 2018
EGU General Assembly 2018

An Operational Global System ("ecPoint-Rainfall") for Forecasting Point Rainfall and Flash Flood Risk

Timothy Hewson, Fatima Pillosu, and Ervin Zsoter
ECMWF, Forecast department - Evaluation section, Reading, United Kingdom (tim.hewson@ecmwf.int)

ECMWF is putting into operations a new methodology, for post-processing raw gridbox rainfall forecasts (RAW) from its ensemble to deliver point rainfall forecasts (POINT). These forecasts have many possible applications, which include highlighting areas that area at an elevated risk from flash floods, and as such we expect to provide related products within the EFAS and GLOFAS web portals. This presentation will show (i) how the system was developed, (ii) how it operates, (iii) verification scores, (iv) a flash flood case study, and (v) options for further improvements.

The post-processing technique employed is one of downscaling. For each gridbox RAW is a single number (for gridbox average precipitation, in e.g. 12h), whilst POINT is a probabilistic representation, for that ensemble member (of point rainfall for any site within the said gridbox in the same period). The final forecast is then the sum of the POINT realisations from each member. The post-processing relies on one being able to predict, a priori, using simple parameters, how the relationships between RAW and POINT will vary. This encompasses sub-grid variability and mean bias. There is clear-cut evidence that these aspects depend strongly on the meteorological setting (e.g. is the rainfall convective), on local geography, and on time of year. In this sense the technique could be described as a "grid-scale analogue method". This will be explained. Clearly if extreme POINT probabilities are elevated, then so is the risk of flash floods. Future work will include investigating ways of feeding the forecast output into hydrological models. The post-processed output may prove competitive alongside or at least complementary to post-processed output of limited area ensembles.

One novel aspect is that a training period of only $\sim$1 year was required, which equates to hundreds of years or more in a traditional site-based post-processing approach. Furthermore, forecasts are not confined to sites where we have observations, but are for everywhere.

We have verified POINT alongside RAW forecasts using 1 year of global observations. Regarding reliability, POINT changes rank histograms to be almost perfectly flat. With regard to resolution, ROC area scores show that the POINT product for 5 days ahead matches the skill of the RAW product for about 1 day ahead (for high totals, e.g. 50mm/12h).