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Global Medium Range Flash Flood Forecasts using "ecPoint-Rainfall" (A Statistical Post-Processing System for Probabilistic Rainfall Forecasts at Point-Scale)

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Flash flood forecasting represents a challenge. Indeed, flash floods are fast evolving events, either in space and time, and to successfully predict such events we need rainfall forecasts that can take into account this feature. For this reason, rainfall inputs in flash flood forecasting come generally from nowcasting, with the benefit of providing good estimates of rainfall amounts, but with the penalty of heavily limiting the lead time of the flash flood predictions up to no more than few hours ahead. An alternative could be given by km-scale models, which can increase the lead time of the forecasts up to 2 days. However, even if these rainfall forecasts provide a good distribution of the rainfall amounts, they can sometime contain biases in the location of the extreme events. Furthermore, they are expensive to run for big areas, so that with the current technology, the deployment of km-scale models for global applications, for medium-range lead times is not yet viable.
Hence, it does not exist a flash flood forecasting system with a continuous global domain. Several regional systems have been developed, but they have mainly a patchy coverage, with entire regions of the globe not covered at all. Given that flash floods are one of the natural hazard events with the highest mortality rate, it is believed that having a global flash flood forecasting system that can deliver predictions with a continuous global domain can save thousands of lives every year.
ECMWF has developed an innovative statistical post-processing system, called ecPoint-Rainfall, that post-processes rainfall forecasts from ECMWF's global ENSemble (ENS) to produce global probabilistic rainfall forecasts at point-scale, up
to day 10. ecPoint-Rainfall anticipates weather-dependent sub-grid variability, and corrects for weather-dependent biases in the model, so it defines a probabilistic relationship between the raw rainfall forecasts (grid-box value for each ensemble member) and the expected point rainfall values within a grid-box. A long-term global verification has shown that the new post-processing system delivers much improved rainfall forecasts in both reliability and resolution. Regarding resolution, ROC area scores show that ecPoint-Rainfall outputs for high totals (e.g. 50mm/12h) provide a gain in lead-time over raw model outputs of several days. For this reason, it is believed that ecPoint-Rainfall can bring great benefits on global flash flood forecasting.
In this presentation it will be given a brief background on ecPoint-Rainfall, and an overview on the 1-year global verification carried out to assess the benefits of using ecPoint-Rainfall in flash flood forecasting when compared with the raw ENS.