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Evaluation of ECMWF products for forecasting severe convection

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The Extreme Forecast Index (EFI) is an ensemble-based post-processed product designed at ECMWF to help in forecasting anomalous weather across the Globe. The EFI compares the real-time ensemble forecast distribution with the model climate (M-climate) derived from a set of re-forecasts that use the same model version and if the forecast is extreme with respect to the M-climate, the real weather is also likely to be extreme. Two meteorological parameters, CAPE and a composite parameter CAPESHEAR, recently have been added to the EFI targeting severe convection. Evaluation of these new EFI products has been carried out over Europe against the ESSL European Severe Weather Database (ESWD) and UK ATDnet lightning detection network, and over the US using the severe reports from the Storm Prediction Center (SPC). The skill of the forecasts has been assessed in terms of the area under the Relative Operating Characteristic (ROC) curve. The new operational EFI products have been shown to exhibit high skill at providing forecast guidance about outbreaks of severe convection in the medium range for both Europe and the U.S. Some limitations will be discussed and some remarks will be provided on particular case studies to help forecasters interpret these products. A combination of both EFIs and Probability of Precipitation (PoP) forecasts will be shown as an example of highlighting the area under the greatest threat of hazards where the convective instability is extreme and the convection is likely to be triggered. Sometimes severe convection can trigger flash floods. A brief reference will be made to a new post-processed product derived from the ECMWF ensemble forecast that provides the probability distribution for point rainfall totals to help assess the risk of flash flooding.