

Extreme Forecast Index - EFI, and Shift of Tails - SOT

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The extraction of extreme weather-related information from the ensemble is not always straightforward. For example, the probabilities themselves do not reveal whether a certain value is unusual or even extreme. A 30% probability of >20mm rainfall in 6hr in July would not be extreme in New Delhi, but would be in Cairo.

The [Extreme Forecast Index](#) (EFI) has been developed to provide specialised forecast guidance for anomalous, extreme or severe weather events, (e.g. heavy precipitation, strong winds, heavy snowfall, extreme temperatures, and unusually high ocean waves). To do this it compares the ENS forecast probability distribution of an event to the [M-climate](#) distribution for the chosen location, time of year and forecast lead time. The underlying assumption is that, if a forecast is anomalous or extreme with respect to the M-climate, the real weather is also likely to be anomalous or extreme compared to the real climate. Simple probabilities derived from ENS (e.g. forecast temperature >32°C) do not highlight the differences in the distributions of forecast but EFI will do so by accounting for the distribution of all the ensemble members. EFI takes values between +1 and -1 and experience suggests that EFI values of 0.5 to 0.8 (irrespective of sign) can be generally regarded as signifying that "unusual" weather is likely and values above 0.8 as usually signifying that "very unusual" or extreme weather is likely.

ENS members giving forecast values well beyond the M-climate extreme contribute no more to the EFI than members just matching the M-climate extreme. The [Shift of Tails](#) (SOT) is an additional product that has been developed to address this point. The SOT index complements the EFI by providing information about how extreme an event could potentially be. Specifically, it compares the tails of the ENS and M-climate distributions.