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Development of Global Heatwave Risk Alert using EPS products

Effective global risk early alert products for high-impact weather are useful for decision-making and timely deployment of resources in humanitarian aid missions among other international operations. In this study, we investigated the feasibility of producing objective risk alert maps up to 10 days ahead based on model re-analysis data and ensemble prediction system (EPS) outputs, using heatwave as an example. We first analysed the relationship between heat-related mortality and “excess heat index”(EHI), a metric representing both the severity and duration of hot weather, in major heatwave historical events. A risk matrix based on the probability of exceedances for various EHI thresholds was then devised. Heatwave risk maps could then be produced using the probability of EHI threshold exceedances derived from model EPS outputs. Retrospective forecast risk maps based on ECMWF EPS outputs for previous heatwave events in Europe were found to correspond well with areas of elevated heat-related mortalities.

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