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Verification of probabilistic forecasts for extreme events

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Accurate predictions of extreme events are of critical societal importance to minimize human losses and economic damages. In many contexts, particularly in the public and the media, forecasts are often evaluated by restricting standard evaluation procedures to subsets of extreme events. However, this conditioning on extreme events can have unexpected and unwanted effects as it leads to improper verification procedures that may discredit even the most skillful forecasters. There is thus a need to develop theoretically justifiable verification procedures for probabilistic forecasts that are specifically tailored towards extreme events. Recently, two approaches to forecast verification for extreme events have been proposed in the economic literature using weighted scoring rules that emphasize specific regions of interest such as the tails of a distribution. We compare these approaches within a general framework for forecast evaluation and in a case study on probabilistic wind speed forecasts over Germany.