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Generalization of information-based concepts in forecast verification

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This work deals with information-theoretical methods in probabilistic forecast verification.
Recent findings concerning the Ignorance Score are shortly reviewed, then the generalization to continuous forecasts is shown. For ensemble forecasts, the presented measures can be calculated exactly.

The *Brier Score* (BS) and its generalizations to the multi-categorical *Ranked Probability Score* (RPS) and to the *Continuous Ranked Probability Score* (CRPS) are the prominent verification measures for probabilistic forecasts. Particularly, their decompositions into measures quantifying the reliability, resolution and uncertainty of the forecasts are attractive.
Information theory sets up the natural framework for forecast verification. Recently, it has been shown that the BS is a second-order approximation of the information-based *Ignorance Score* (IGN), which also contains easily interpretable components and can also be generalized to a ranked version (RIGN).
Here, the IGN, its generalizations and decompositions are systematically discussed in analogy to the variants of the BS. Additionally, a *Continuous Ranked IGN* (CRIGN) is introduced in analogy to the CRPS. The applicability and usefulness of the conceptually appealing CRIGN is illustrated, together with an algorithm to evaluate its components reliability, resolution, and uncertainty for ensemble-generated forecasts. This is also directly applicable to the more traditional CRPS.