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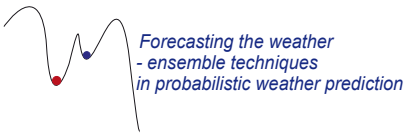

Ensemble Diversification Indices

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Interpreting ensemble forecasts require an understanding of the information coming along with a forecasted probability distribution function (pdf). This information is determined by the characteristics or the shape of the pdf. The ensemble mean roughly indicates the value of the forecasted parameter. The spread of the pdf is commonly used to estimate the uncertainty of the ensemble mean. But often the spread-skill relation of ensembles lacks reliability. This might be due to missing or too much spread but can be related to a distorted pdf as well. It is observed that initial perturbation ensembles need some time to spread out. Most of the EPS members stay close together while some others respond very sensitive to the initial perturbations. In the case of pdfs with large tails or multi-modal distributions the spread is not a good indicator of its informative value.

Based on information theory an index is presented which measures the diversity of a probability distribution according to the clustering of ensemble members. Depending on the nature of the bins, which sample the probability distribution, two indices can be generated: one that incorporates the effect of the spread and another which is independent of the spread only measuring the diversity of the shape of the pdf.

Both indices are diagnostic tools giving local guidance on the informative value of an ensemble forecast field from a somewhat different point of view than the spread. Applications are in ensemble interpretation, ensemble calibration (e.g. incorporate the diversity of the ensemble distribution in kernel dressing) or in selecting proper initial perturbations.