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Progress and challenges in NWP forecast verification

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The increased resolution of numerical weather prediction models has created a need for new and different diagnostic methods to understand their limitations. Recent years have seen a growing interest in new approaches for forecast verification, as evidenced by the rising number of publications on newly developed verification techniques. Ensemble prediction has also become widespread, calling for ways to assess not only their spread but also the probabilistic and scenario products that can be generated from ensembles. Prediction of extreme weather, while always of interest, has taken on new importance in light of our improved understanding of weather and climate variability and change, requiring verification methods that are targeted to extreme and rare events. Forecasting applications based on meteorological predictions, for example, aircraft flight time, continuous streamflow, wildfire behaviour, and renewable energy prediction, call for new ways of evaluating these forecasts that are more relevant to the downstream application.

This talk will summarise recent progress in NWP verification including wider use of diagnostic verification, development of new scores and techniques for difficult problems, and evaluation of forecasts for applications using meteorological information. There are many interesting challenges, particularly the improvement of methods to verify high resolution ensemble forecasts, seamless predictions spanning multiple spatial and temporal scales, making best use of new observations, linking data assimilation and verification, and developing better and more intuitive forecast verification products for end-users.