



## **Forecast Validation and Verification for Earthquakes, Weather and Finance**

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Techniques for earthquake forecasting are in development using both seismicity data mining methods, as well as numerical simulations. Testing such forecasts is necessary not only to determine forecast quality, but also to carry out forecast improvement. A large number of techniques to validate and verify forecasts have been developed for weather and financial applications. Many of these have been elaborated in public locations, including [http://www.bom.gov.au/bmrc/wefor/staff/eee/verif/verif\\_web\\_page.html](http://www.bom.gov.au/bmrc/wefor/staff/eee/verif/verif_web_page.html). Typically, the goal is to test for forecast resolution, reliability and sharpness. A good forecast is characterized by consistency, quality and value. Most, if not all of these forecast verification procedures can be readily applied to earthquake forecasts as well. In this talk, we discuss a number of these methods, and show how they might be useful for both fault-based forecasting, a group that includes the WGCEP and simulator-based renewal models, and grid-based forecasting, which includes the Relative Intensity, Pattern Informatics, and smoothed seismicity methods. We find that applying these standard methods of forecast verification is straightforward, and we conclude that judgments about the quality of a given forecast method can often depend on the test applied.