Forecast quality assessment of seasonal-to-decadal predictions
A posteriori verification of how skillful was a climate prediction or a set of predictions – here we focus on monthly to decadal timescales - is essential to estimate the quality of climate forecast system and its potential usefulness in the future.

Summary

A climate model at any level of complexity is an approximation of the climate system that also employs approximate physics, parameterizations, and numerical methods. The development and improvement of forecast systems as well as the improvement of bias correction and calibration methods are important for establishing a hierarchy in quality of available dynamical and statistical forecast systems.

At the most basic level, climate forecast verification is investigation of the properties of joint distribution of observation and forecast. Cross-validation to separate the training and test OBS (cross-validation to avoid artificial skill) must be taken into account.

Climate forecasts of categorical and continuous predictands can be deterministic or probabilistic. There is expanding interest in the application of statistical downscaling and regional climate modeling. Development and application of statistical prediction methods for reference forecasts is important for establishing a hierarchy in quality of available dynamical and statistical forecast systems.

Users can also require measures of utility to examine added economic value of comprehensive climate predictions instead of relative improvements as well as socio-economic benefits achievable through such forecast-assisted decision-making.

Objectives

The objectives of this research line are the development and application of:

1. skill scores and other metrics for forecast verification
2. statistical prediction methods for reference forecasts
3. post-processing drift and bias correction, and calibration methods
4. techniques to assess prediction skill based on multiple OBS and forecast sources
5. user-oriented measures that address specific aspects of forecast quality or utility

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