

On Observability of Atmospheric Model Tendency Errors

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Objective knowledge on probability distributions of atmospheric model tendency errors is needed both in ensemble prediction and ensemble data assimilation. In order to identify and estimate a model for model errors, a sample of real model errors (the training sample) is needed. The question whether such a sample can be obtained (at observations locations) by comparing model tendencies with observed tendencies is addressed in this study.

In predictability experiments with simulated model errors and the limited-area COSMO model, reproducibility of model errors from finite-time model-minus-observed tendencies is studied. It is found that in 1-h to 6-h tendencies, model errors appear to be too heavily contaminated by noises due to, first, initial errors and, second, trajectory drift as a result of model errors themselves. The resulting reproducibility error is far above the acceptable level. The conclusion is drawn that accuracy and coverage of current routine observations are far from being sufficient to reliably estimate model errors.