Geophysical Research Abstracts
Vol. 15, EGU2013-4738, 2013
EGU General Assembly 2013

A novel approach for tuning ensemble prediction systems

Antti Solonen (1,2) and Heikki Järvinen (3)

(1) Finnish Meteorological Institute, Helsinki, Finland, (2) Lappeenranta University of Technology, Finland, (3) University of Helsinki, Department of Physics, Finland

Ensemble prediction systems (EPS) provide a practical way to "predict the predictability" of geophysical flow. A reliable EPS system is able to describe the flow-dependent uncertainties in model predictions. In practice, achieving this target involves manual tuning of the amplitudes of the uncertainty representations. An algorithm is presented here which estimates these amplitudes off-line as tunable parameters of the system. The tuning problem is posed as follows: find a set of parameter values and their uncertainties such that the EPS correctly covers uncertainties in weather predictions. The algorithm is based on approximating the likelihood function of the parameters directly from the standard EPS output and utilizing atmospheric observations as extensively as in operational data assimilation. The approach is demonstrated here using an EPS emulator based on a modified Lorenz'95 system where the forecast uncertainties are represented by errors in the initial state and forecast model formulation. It is shown that the approach yields a well tuned EPS system in terms of classical verification metrics, such as ranked probability score, spread-skill relationship, and rank histogram. In the future, the algorithm will be implemented to more realistic ensemble prediction system.