EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-92-1, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Is it possible to place an upper bound on the predictability of tropical cyclone tracks?

M. Plu

Météo-France, LACy (UMR 8105 CNRS/Météo-France/Université de La Réunion), La Réunion, France
(matthieu.plu@meteo.fr)

Lorenz (1982) designed a statistical method to determine a lower bound and an upper bound on atmospheric predictability, based on forecasts from a numerical model. Its application to 500 hPa geopotential height fields forecasted by the ECMWF model showed consistent and convincing results. The governing idea is that an upper bound on predictability may be obtained as the amplification of the difference between close model states. Such states are taken to be forecasts valid at the same instant starting from different initial times. The lower bound is the performance on a state-of-the-art operational model.
The purpose of this study is to find an upper bound on the predictability of tropical cyclone tracks by applying Lorenz's method on the forecasts by several operational global models. Cyclone positions are computed on the ouputs of these models thanks to a simple, yet robust tracking algorithm. To reach statistical significance, several cyclone seasons over the most active basins are considered. Results show that the predictability bounds depend on the numerical model, but this relationship is inconsistent with the realism of the model. The reasons why the Lorenz's method cannot be applied to the predictability of tropical cyclone tracks are investigated.

Reference

Lorenz EN. 1982. Atmospheric predictability experiment with a large numerical model. *Tellus*, **34**: 505–513.