Geophysical Research Abstracts, Vol. 7, 02867, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02867

Information flow in atmospheric ensemble predictions

R. Kleeman (1)

(1) Courant Institute of Mathematical Sciences, (2) New York University
(kleeman@cims.nyu.edu)

The basic problem of meteorological prediction it to take information obtained by an observing platform about the initial conditions of the atmosphere and propagate this forward in time using a dynamical model. This flow of information from the initial conditions to predictions is of considerable practical interest because improved information in specific areas of the initial conditions may lead to improved predictions in other targetted regions. The problem is complicated by the fact that statistical/ensemble predictions are an essential part of the process and additionally nonlinearity plays a fundamental role. In this presentation we describe a new method of measuring this flow using information theory. We then use large ensemble predictions from a realistic primitive equation atmospheric model to test these ideas in an environment with some relation to practical reality. We find that flow is dominated in mid-latitudes by the advection effects of the jetstream and storm tracks and that very specific regional areas can be identified for improving the observing network. We also are able to draw conclusions about the relative importance of horizontal and vertical information flow as well as how the flow varies as different physical variables such as temperature and wind are considered.