Geophysical Research Abstracts, Vol. 8, 00567, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00567

Simple models of error growth

R. Pita Perdigao (1), J. Teixeira (2) and C.A. Reynolds (3)

(1) Centro de Geofisica da Universidade de Lisboa (CGUL), Lisboa, Portugal; (2) NATO Undersea Research Centre (NURC), La Spezia, Italy; (3) Naval Research Laboratory (NRL), Monterey, CA, USA; (rperdigao@fc.ul.pt)

Geophysical fluids such as the Atmosphere and the Oceans are widely known to be extremely complex systems driven by highly nonlinear dynamics. Consequently, models aiming at representing them need to take into account their inherently unstable nature. This natural instability is associated with a rapid growth of the uncertainties on the initial conditions and of those associated with the fact that models are not perfect representations of reality. Even so, these uncertainties grow on the mean in a relatively straightforward manner, thus allowing for simple models of uncertainty growth to mimic the general behaviour in a relatively realistic way. Unfortunately though, the atmospheric and oceanic model uncertainties have not yet been incorporated in these uncertainty growth models in a satisfactory manner. The present work is, therefore, aimed at tackling this issue. For this purpose, simple uncertainty growth models are constructed in such a way to try to take into account the following terms: model uncertainty due to numerical truncation and physical parameterizations, exponential (chaotic) growth, and nonlinear saturation. These models are then used to try to gain an improved insight into the behaviour of uncertainty in complex models such as full oceanic and atmospheric prediction systems.