Geophysical Research Abstracts
Vol. 13, EGU2011-12091, 2011
EGU General Assembly 2011

Exploiting the parallels between nonlinear systems: geospace complexity vs. atmospheric complexity.

Nicholas Watkins
British Antarctic Survey, Cambridge, United Kingdom (nww@bas.ac.uk, 01223 221226)

Richard Feynman's famous dictum that "the same equations have the same solutions" has long been been fruitful in mathematical geophysics. Two examples illustrate such "universal" behaviour. A familiar one is the way in which a common branch of physics, fluid mechanics, underlies key behaviours in two otherwise distinct physical systems, the atmosphere and ocean. Another, newer example is the exploitation of the generic properties of coupled nonlinear physical systems, a branch of the emerging science of complexity. I will show some examples of topics addressed over the last few years by myself and others in geospace complexity research which may have points of contact to the atmospheric complexity problem, notably: a) the problem of low frequency "1/f" power spectra; b) non-Gaussian "heavy tailed" probability distributions; c) the presence of control parameters in what were originally thought to be self-organised systems; and d) the use of dimensional analysis in determining the possible control parameters in complex systems.