Hydrol. Earth Syst. Sci. Discuss., 3, S617–S618, 2006
www.hydrol-earth-syst-sci-discuss.net/3/S617/2006/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Modeling geophysical complexity: a case for geometric determinism" *by* C. E. Puente and B. Sivakumar

Anonymous Referee #2

Received and published: 1 August 2006

The authors review a deterministic geometric procedure to data modelling, based on a geometric representation of geophysical records as derived distributions of deterministic multifractal measures via simple deterministic fractal functions. The same model is part of their own scientific production arising to the early nineties. The paper is clear and concise nevertheless the core of the paper seems to be represented by the discussion about scientific and philosophical implications of the proposed model. It is possible to argue that the procedure, yes, may "furnish the possibility of encoding holistically complete data sets with substantial compression ratios" but, on the other hand, the possibility of studying the dynamics of geophysical processes in the compressed parameter space of subsequent sets still appears to be far from a real possibility since the procedure still lacks of a physical interpretation. In particular such perplexity is

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

EGU

more pressing if one focuses on the different feasible hydrological applications. On one hand, applications to width function of channel basins or basin topography could be thought as suitable for a deterministic geometric interpretation but they cannot be easily thought as dependent on a transformation of turbulence-related measures. On the other hand rainfall (or runoff ?) time series may interestingly depend on atmospheric turbulence but in such a case the representation of a single observation data set lacks of a real application interest. Also, the implementation of a generation procedure that endorses the process stochasticity necessarily needs a deeper knowledge of the dual representation of the process in the surrogate parameter space. Such knowledge is necessary in order to capture the overall complexity of rainfall and its extremes. Moreover not any feasible interpretation is provided with relation to the example rainfall datasets represented in figure 1 and 2 in order to evaluate the soundness of the used fractal function including the scaling parameters d1 and d2 and other characteristic model features like fractal dimension, iteration frequencies and projection angle. Also possible relationships of such model features with important process signatures like irregularity, intermittency, long-term persistence is not mentioned in the paper.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 1407, 2006.