

Fractal signatures of chaotic advection in precipitation

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Finite-size aerosols under chaotic advection often approach a strange attractor. They move chaotically on this fractal set but, in the presence of gravity, they have a net vertical motion downwards. In many practical situations, information of the advection dynamics of the aerosols is fundamental, whereas observational data might be available only at a given level, for example at the ground level. We uncover two fractal signatures of chaotic advection of aerosols under the action of gravity [1]. Each one enables the computation of the fractal dimension D_0 of the strange attractor in the physical space solely from data obtained at a given level, without prior knowledge of the advection dynamics. We illustrate our theoretical findings with a numerical experiment and discuss their possible relevance to meteorology.

[1] R. D. Vilela, T. Tél, A.P.S. de Moura, and C. Grebogi, *submitted*.