Some Random Thoughts on Stochastic Parametrizations

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Considerable efforts have gone into stochastic parametrizations of the dynamical, physical and chemical effects that typically occur on scales that are smaller than those that can be resolved by the computational devices of the day. These efforts have proceeded traditionally along the lines of linear models with additive noise and, more recently, have used fairly sophisticated and even mathematically rigorous ways of including nonlinear dynamics and multiplicative noise.

The present talk reviews some of these approaches and mentions two ways of improving the existing methodologies. One way relies on the sequential-estimation methods of data assimilation — extended Kalman filtering and its brothers and cousins — to estimate the parameters of a noise process that represents the small-scale effects. The other way uses a lattice model to study the interaction between cloud and radiative processes, on the one hand, and large-scale dynamics, on the other.