Geophysical Research Abstracts,
Vol. 11, EGU2009-3229, 2009
EGU General Assembly 2009
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On stochastic models of physical systems: Diffusion and (alpha-stable) Levy processes

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Stochastic descriptions of multiscale interactions are more and more frequently found in numerical models of weather and climate. These descriptions are often made in terms of differential equations with random forcing components. In this talk, I shall discuss some differences between diffusion processes, where the random forcing is Gaussian white noise, and alpha-stable Levy processes. The differences, while fundamental, are sometimes harder to distinguish in practice than might be expected.