Accurate Integration of Stochastic Climate Models

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Numerical models are one of the most important theoretical tools in atmospheric research, and the development of numerical techniques specifically designed to model the atmosphere has been an important discipline for many years. In recent years, stochastic numerical models have been introduced in order to investigate more fully Hasselmann's suggestion that the effect of rapidly varying "weather" noise on more slowly varying "climate" could be treated as stochastic forcing. It is the purpose of this study to introduce an accurate method of integrating stochastic climate models and to compare it with some other commonly used techniques. We show that particular care must be used when the size of rapid variations in the "weather" depends upon the "climate" and discuss how the implementation of stochasticity in a numerical model can affect the detection of multiple dynamical regimes in model output.