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Stochastic parameterizations in comprehensive climate models (solicited)

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Our understanding of the climate system has been revolutionized by the development of comprehensive computer models. As with all models, climate models are only approximate representations of reality, because many physical processes that are known to be key aspects of the climate system are too small or too fast to be explicitly modelled. Such processes must be parameterized using closure schemes. Examples in the atmosphere include convection, clouds, and gravity waves, and examples in the ocean include convection, eddies, and internal waves.

Closure schemes in climate models have traditionally been deterministic. Stochastic closure schemes have recently become an increasingly popular alternative, however. This talk will give several examples of implementations of stochastic parameterizations in state-of-the-art comprehensive coupled climate models. The impacts on the simulated climate are generally found to be beneficial, and include improvements to both the mean state and the internal variability.