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*Well-Posedness Results for the Stochastic Primitive Equations of the Oceans and Atmosphere.*

The primitive equations are widely regarded as a fundamental description of geophysical scale fluid flows and forms the core of the most advanced numerical general circulation models (GCMs). This system may be derived from the compressible Navier- Stokes equations with a combination of empirical observation and scale analysis. In view of the wide progress made in computation the need has appeared to better understand and model some of the uncertainties which are contained in these GCMs. In this context stochastic modeling has appeared as one of the major modes in the contemporary evolution of the field.

While the mathematical theory for the deterministic primitive equations is now on a firm ground it seems that very little has been done so far on its stochastic counterpart. For this and other nonlinear SPDE's the issue of compactness remains a challenging problem especially for the case of nonlinear multiplicative noise. In this talk we discuss some recent work on the global existence and uniqueness of solutions of the primitive equations in both 2 and 3 spatial dimensions. This is joint work with A. Debussche, N. Glatt-Holtz, and M. Ziane. (Received March 07, 2011)