1035-60-1976 **William D Collins*** (WDCollins@berkeley.edu), LBL, 1 Cyclotron Road MS 90R1116, Berkeley, CA 94720-8126. *Scaling laws, scale invariance, and climate prediction.* Preliminary report.

Climate models are based upon a discretization of the Navier Stokes equations. In the design of these models, one usually assumes that the physical processes are uniquely determined by and in statistical quasi-equilibrium with the fluid motion resolved by the model. This assumption was justifiable for previous generations of models with relatively coarse spatial and temporal resolution. However, the assumption is demonstrably incorrect for current and future climate codes. Although climate predictions should be invariant to the truncation scale of the underlying model, in fact the predictions may depend strongly on its spatial and temporal resolution.

These results demonstrate the need for a fundamental change in the representation of physical processes in climate models. Future models should be based upon stochastic and auto-regressive formulations of physics that satisfy the basic scaling laws of the atmospheric and oceanic fluids. (Received September 21, 2007)