Experiments in the use of scaling for convective parameterizations for models of the atmosphere

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The problem of parameterization of physical process in large scale numerical models of the atmosphere has historically focused upon models of the 'average' or mean tendencies and the models have been of two classes: sub-grid models which depend upon Kolmogorov similarity and those which are developed from idealized process models. For many sub-grid physical processes little use of scaling structure has been incorporated in the development of parameterizations. I will describe some recent efforts and new strategies aimed at moving beyond the use of non-scaling process models for the computation of the sub-grid tendencies due to sub-grid effects of clouds, cumulus convection, orographic drag and radiation. Preliminary tests of the applicability of scaling information in convective parameterizations loosely based the ideas of Scotti and Meneveau in new multi-scale computations with the NCAR WRF model will be presented.