1035-62-1998 **Douglas W Nychka*** (nychka@ucar.edu), National Center for Atmospheric Research, PO Box 3000, Boulder, CO 803073000, and **Jeffrey L Anderson**, National Center for Atmosspheric, PO Box 3000, Boulder, CO 803073000. *Combining climate models and weather observations using dynamical systems and statistics.*

Climate models are large numerical codes, based on physics, that simulate the motions and thermodynamics of the Earth's atmosphere and ocean through a dynamical system. By varying the inputs (forcings) to these models one can simulate both current and future climate and so provide projections of the impact of human activities on our physical environment. Climate models typically have many free parameters and a mathematical and statistical challenge is to estimate these parameters by matching model behavior with observed data. Here we sketch how this can be done in a framework of nonlinear filtering and and we give a specific example of estimating gravity wave drag for a large global atmospheric model (NCAR CAM). We also suggest some open mathmatical problems that are motivated in this context with one important thread being the inherent uncertainty in any model of the Earth's physical processes. (Received September 21, 2007)