1035-86-1394 **R. Lee Panetta*** (panetta@ariel.met.tamu.edu), Dept of Atmospheric Sciences, Texas A&M University, College Station, TX 77843. *On the dissipativity of the two-layer quasi-geostrophic beta plane equations.*

The two-layer beta-plane quasi-geostrophic model plays a central role in geophysical fluid dynamics. It is a pair of coupled non-linear partial differential equations involving functions of two space variables and one time variable (streamfunctions for coupled two-dimensional flows). As we demonstrate, numerical solutions to the equations display analogues of such important features of the climate system as baroclinic Rossby waves and jet streams, and also certain features of two-dimensional turbulence. As in climate models, many interesting features are revealed only by "long time averaging" of the numerical solutions. The challenge of providing a rigorous justification for this averaging in the case of the vastly more complicated climate models is daunting, but in the case of our model we have made progress. We have proven the long-time existence and uniqueness of solutions to the equations, that solutions are analytic in space and time, and that the equations are dissipative (hence have a global attractor). We were able to establish dissipativity by exploiting a formal similarity (that we explain) of the quasi-geostrophic system to the simpler one-dimensional Kuramoto-Sivashinsky equation, an equation that arises in modeling chemical reactions and thin film flows. (Received September 19, 2007)