1085-86-186 **Erich L Foster*** (erichlf@vt.edu), **Traian Iliescu** and **Zhu Wang**. *A Finite Element Discretization of the Streamfucntion Formulation of the Stationary Quasigeostrophic Equations of the Ocean.*

We present a conforming finite element discretization of the streamfunction formulation of the one-layer stationary Quasigeostrophic equations, which are a commonly used model for the large scale wind-driven ocean circulation. Optimal error estimates for this finite element discretization with the Argyris element are derived. Numerical tests for the finite element discretization of the Quasigeostrophic equations and two of its standard simplifications (the linear Stommel model and the linear Stommel-Munk model) are carried out. By benchmarking the numerical results against those in the published literature, we conclude that our finite element discretization is accurate. Furthermore, the numerical results have the same convergence rates as those predicted by the theoretical error estimates. (Received September 10, 2012)