1096-35-2759 **Reza Malek-Madani*** (rmm@usna.edu), 121 Blake Rd., Annapolis, MD 21402, and **Kevin McIlhany** and **Kayo Ide**. *A Lagrangian and Eulerian Analysis of a Geophysical Fluid Flow arising in the Chesapeake Bay.*

We present results for a velocity vector field obtained from solving the governing partial differential equations of motion in the domain defined by the Chesapeake Bay, and augmented with boundary conditions and wind forcing terms supplied from field data. The underlying time-dependent dynamical system, which is discrete in time and space, is then studied with the purpose of identifying its invariant manifold structure. Several metrics, Lagrangian as well as Eulerian, will be computed with the goal of understanding special features of the fluid flow in this three-dimensional estuary. Special attention is given to regions in the bay where the geometry is complex, as well as to the mouth of the bay where understanding transport and mixing there remains a critical area of research. A significant part of this effort is dedicated to comparing various metrics and their skills in predicting invariant structures. (Received September 18, 2013)