



Detecting transport barriers using Lagrangian descriptors with applications to the Baltic Sea

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The method of Lagrangian descriptors developed by A. Mancho and co-workers in [1] has been applied by the authors to the dynamics of the water masses in the Arkona Basin and the Bornholm Basin in the South Western Baltic Sea. The South Western Baltic Sea is the region where water exchange between the North Sea and the Baltic Sea takes place. It is characterized by mixing between salty, cold North Sea water masses and brackish, warm Baltic Sea water masses in winter and stratification in summer.

The Lagrangian descriptor is used to identify eddy cores and stable and unstable manifolds in the velocity field in the Arkona Basin and in the Bornholm Basin in February 2006 and July 2006. The results for February and July for each Basin are compared to illustrate differences in the dynamics between summer and winter. Furthermore, the results of the Lagrangian descriptor are compared with the dynamics of the salinity field, the temperature field and the density field in the Arkona Basin and in the Bornholm Basin in February and July 2006. This is done to show that the identified structures fit the structure in the dynamics of the temperature field, the salinity field and the density field.

[1] Jimenez-Madrid, J., and Mancho, A.: Distinguished trajectories in time dependent vector fields. *Chaos* 19 (2009), 013111-1-18.