# The Role of Spiral Eddies in the Non-Linear Instability at a Two-Geofluid Interface

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**Abstract:** Based on new approaches to the non-linear instability at a two-geofluid interface, the interaction of plumes and spiral eddies at the sea surface, among others, are investigated. As-coordinate numerical model produces the broad structure of the coastal dynamics in the South-Eastern Adriatic Coast where eight rivers are discharged. The complex picture of the circulation in the region is conjectured to be a balance between conventional forcing (tides, atmosphere and buoyancy) and the hitherto unknown effect of spiral eddies as a new show of the non-linear instability at a two-geofluid interface.

Taking in account the theoretical aspect, the research belongs to investigations dealing with the instability in fluids, in general, and in geofluids particulary. This instability is caused by the density gradient and is influenced by oceano-atmospheric factors in the geofluid case. From the physical point of view, the unstable configuration of Fig. 3 is a superposition of disturbances on the value of parameters and for both fluids: freshwater and seawater.

Under nonlinear evolution fluid problems and applications a new second-order numerical method is also considered where our aim have been to find any possibility to improve the solution of equations. A lot of numerical simulations in the Southern Adriatic were undertaken to understand the dynamics of the river plume. On this background, we have started to develop the ideas for the interaction among plumes and the instability concerning to. The results have provided an unprecedented picture of the circulation in this region which is changed by spiral eddies.

0-933957-31-9