



Factors that influence the current circulation along the Romanian Black Sea coast

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In this work we present a study of the circulation driven by the freshwater and by the wind in the Romanian coast. To carry out this study a finite element model of the whole Black Sea has been used to obtain a high resolution mesh near the coast and the Danube inlets able to resolve the sub-mesoscale features. The computational domain covers the whole Black Sea, to avoid problems in specification of the open boundary conditions. Several theoretical simulations were carried out in order to understand the influence of the Danube discharge, wind and salinity on the coastal current. The obtained results show that the discharge from the Danube strongly influences the currents along the entire Romanian Black Sea coast. The simulations results show the formation of an along shore current mainly in the surface layers, which is in agreement with previous studies on the Black Sea.

The strength of the coastal current depends on the Danube discharge. However, even at a low discharge, there is still the formation of a coastal current, due to the changes in salinity induced by the freshwater from the Danube River.

The wind has a different effect depending on the direction. Wind from northeast keeps the freshwater near the coast while wind from southern directions pushes it offshore and rapidly mixes it with the more salty water.