Ocean Sci. Discuss., 7, C136–C137, 2010
www.ocean-sci-discuss.net/7/C136/2010/

Ocean Science
Discussions

Interactive comment on "Wind forcing effects on coastal circulation and eddy formation around a cape" *by* P. De Gaetano et al.

P. De Gaetano et al.

p.degaetano@gmail.com

Received and published: 8 April 2010

In this paper, a barotropic ocean model is developed and different kinds of forcing are considered. Indeed, the main aim of the paper is to analyze the response of the circulation model to the variations in wind forcing. Although the BOLAM 7 model is not sufficiently accurate, as it has been underlined by the anonymous referee 1, it makes possible to understand the correlations between wind forcing and coastal circulation. In particular intensification of the countercurrent and the eddy can be observed. Moreover, these results confirm the importance of considering the local wind patterns in the area under study opening the way to future developments using a wind forcing with the same spatial resolution of the circulation model (500 m).

In regard to the variability of drag coefficient with wind velocity, the differences in the

obtained results are not only due to grater values used in the case of variable value than in the constant one. Indeed, the events of wind blowing from south-west are very intense but not very frequent in the studied area, so only considering the C_D value varying with the wind intensity, their effects on the coastal circulation can be simulated.

We found that summer is characterized by a wind blowing from south-west: it is the case of a wind blowing towards shore. The momentum equations can be approximate with a balance between Ekman transport (in this case towards south-east) and pressure gradient (towards west). In the eastern part of the Promontory, the west component propagation is obstructed by the presence of the cape. Consequently, the coastal current flows in the south-east direction forming the countercurrent. Therefore, this countercurrent is mainly due to the effect of the summer-southerly winds, while the general circulation in the area under study is north-westerly. For this reason, a prevalent current flowing from south-east to north-west, the circulation model is forced at the eastern boundary with the outputs of a regional model.

Interactive comment on Ocean Sci. Discuss., 7, 207, 2010.