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Numerical Experiments Concerning the Physical Mechanisms of the Nearshore Currents

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ABSTRACT

In this work we present some numerical tests aiming to emphasize the role of some mechanisms in the nearshore currents. The longshore pressure gradient can be quite a substantial force for the longshore currents in the nearshore region, in addition to the forcing provided by the radiation stress gradients. These forces are mainly balanced by the bottom friction and the dispersive mixing due to the vertical variation of the currents. The separate effects of the longshore pressure gradient, the bottom friction, and the dispersive mixing in the prediction of the nearshore circulation over a longshore varying barred beach will be analyzed. Another issue that is relevant in nearshore currents is whether, on a beach of a general topography, the observed (or predicted) longshore currents are stable or unstable, which in the latter situation can lead to the so-called shear waves. In order to address the study of shear waves over a longshore non-uniform barred beach the dynamics of these motions over a longshore uniform plane beach will be first investigated. The example pursued shows the results from SHORE-CIRC which is a quasi 3D model for nearshore circulation that combines a numerical solution for the depth-integrated 2D horizontal momentum balance equations with an analytical solution for the 3D current profiles.

Keywords: *nearshore currents, models, experimental data, costal environment*

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