Geophysical Research Abstracts
Vol. 17, EGU2015-7208, 2015
EGU General Assembly 2015

Impact of relative winds on the computation of heat and momentum fluxes and their feedback on ocean currents at regional scales.

Antonio Olita (1), Ilaria Iermano (2), and Roberto Sorgente (1)

(1) CNR-IAMC, Torregrande (OR), Italy (antonio.olita@cnr.it), (2) Department of Sciences and Technologies, Parthenope University, Naples, Italy

Two numerical experiments were conducted in the seas of Sardinia (Western Mediterranean) to assess the impact, at coastal scales, of the use of relative winds in the computation of heat and momentum fluxes through bulk formulas. The model, the Regional Ocean Modeling System (ROMS), was implemented at 2km of resolution in order to well resolve (sub-)mesoscale dynamics. Small changes (1–2%) in terms of spatially-averaged fluxes correspond to quite large spatial differences of such quantities (up to 15–20%) and to comparably significant differences in terms of mean velocities of the surface currents. Wind power input of the wind stress to the ocean surface P results also reduced by a 15%, especially where surface currents are stronger. Validation with satellite SST suggests that such a modification on the fluxes improves the model solution especially in cyclonic areas, where the heat fluxes correction is dominant. Surface currents change above all in their fluctuating part, while the stable part of the flow shows changes mainly in magnitude and less in its shape. Both total and eddy kinetic energies of the surface current field results reduced in the experiment where fluxes took into account for surface currents. Dynamically, the largest correction is observed in the SW area where anticyclonic eddies approach the continental slope. This reduction also impacts the vertical dynamics and specifically the local upwelling that is diminished both in extension and magnitude.