Geophysical Research Abstracts
Vol. 12, EGU2010-1245-2, 2010
EGU General Assembly 2010

To an unusual upwelling event observed in the Adriatic Sea in the summer of 2003: Analysis and numerical modeling

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The goal of this research is to analyze and simulate the response of the Western Adriatic Current (WAC) to an abnormal event that occurred in the Adriatic Sea in mid-summer of 2003. At this time, a combination of extremely low discharge from the Po River and from other northwestern rivers caused by the prolonged dry season and the dominant Sirocco wind produced an 'unusual' upwelling and caused the WAC to reverse along the northern and central Italian coasts. The simulations employed a high-resolution, low dissipative version of the DieCAST circulation model that is initialized with monthly averaged temperature and salinity data and spin up with a use of climatological wind data. Numerical experiments are performed with the use of COAMPS wind stress and heat flux data. The model runs performed under Sirocco wind forcing in combination with low river discharge reveals that such these conditions do trigger upwelling and the reversal of the WAC along the Italian coast. The upwelling relaxation caused by changes in the wind direction is also studied and anaysed. Simulation results are in a good agreement with observations.