



Interannual variability of Black Sea's hydrodynamics and connection to atmospheric patterns: model study.

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The natural inter-annual variability of the Black Sea hydrodynamics is investigated for the period 1960-2000 using conjointly modeling and satellite measurements of sea surface temperature (SST) and sea level anomaly (SLA). The eddy-resolving GHER3D model is used to complete surface information obtained from satellite and to allow the linking of surface observed variations to underlying internal dynamics.

This additional information brings new findings revealing the major role of the riverine discharge in the inter-annual modulations of the intensity of the permanent basin-wide cyclonic circulation, the Rim current. The importance of the Rim current as a driver of the Black Sea physical and ecological conditions is in turn highlighted by the identification of strong impacts of the Rim current intensity on the Cold Intermediate Layer dynamic, and on the exchange of water from the shelf to the open basin.

A joined statistical analysis (based on self organizing maps) of the atmospheric conditions for the same period is used to identify patterns of air temperature and winds anomalies and their roles in driving the depicted modes of variability of SST and circulation.

The two leading modes of SST variability are identified as direct response to the consequence of large scale teleconnection patterns (North Atlantic oscillation and East Atlantic - West Russia oscillation) on the Black Sea atmospheric conditions.