

## Features of the Circulation and Dynamics of the Black Sea as Inferred from Hydrographic Data and Satellite Imagery

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The Black Sea has a unique environment in that it is the world's largest semi-enclosed basin whose 30% volume is anoxic. It communicates with the Aegean through the Bosphorous-Sea of Marmara-Dardanelles system. The basin receives significant amounts of run-off from a catchment of significant size to the extent that, together with rainfall, the net freshwater input exceeds the evaporation losses by a factor of two.

The primary features of the general circulation based on climatological data and on the recent quasi-synoptic data obtained in joint Soviet-Turkish surveys, include a rim current with large amplitude meanders and anticyclonic eddies embedded in it. The rim current and the associated mesoscale structures reflect primarily the interactions with topography and the baroclinic instabilities of a slope current. The existence of two sub-basin scale semi-permanent gyres with recurrent multiple centers is reconfirmed. Two anticyclonic centers, one located at the southeast corner of the basin and the other to the southwest of the Crimean Peninsula appears to be the distinguishing permanent features of the general circulation.

These features of the general circulation and of the dynamics of the Black Sea are confirmed by satellite imagery. However, the satellite imagery further indicates other dynamical features that can not be inferred from *in situ* data without adequate resolution. These features include coherent structures such as squirts and intense jets with dipole (mushroom) eddies at their terminus. Some of these features imply crucially important cross-shelf and shelf-deep water exchanges.

Most of the mesoscale features of the Black Sea are not as sluggish as those encountered in the Eastern Mediterranean. As a result, the correlations between the *in situ* and satellite data require special care in their analysis. Real-time, fine resolution satellite imagery is therefore of critical importance in understanding crucial elements of the dynamics of the Black Sea.



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