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Temperature, Salinity and Flow Variations in the Strait of Istanbul (Bosphorus)

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Monthly temperature and salinity of the upper and lower layers in the Strait of Istanbul are evaluated between February 1996 and February 2009 to obtain long term changes in physical parameters in the strait. The volume fluxes of the layers are also calculated by using monthly ADCP transects data collected in both exits of the strait, from June 1999 to February 2009.

The Strait of Istanbul (Bosphorus) connects the Sea of Marmara and the Black Sea. It has a two-layer exchange flow system. The upper layer with ∼18psu flows from the Black Sea and the lower layer with ∼38psu flows from the Sea of Marmara. The southward barotropic flow in the upper layer and baroclinic flow in the lower layer are separated from each other by a thin interface. The average volume fluxes of the layers (600km3year-1 in the upper layer, 300km3/year-1 in the lower layer) were calculated in terms of the salt and water budget of the Turkish Sea Straits. Investigation of monthly temperature, salinity and ADCP measurements at two ends of the strait indicate that these parameters vary in wide range. The temperature is changes between 1.9°C in February 1996 and 26.7°C in July 2002 in Black Sea enters. The salinity is in the range of 15.01-18.64 psu.

The flow exchange is mostly influenced the hydraulic conditions constituted geometry of the strait and rapid changes in atmospheric conditions. In the strait of Istanbul, the volume fluxes vary in an extensive range (upper layer: 5-1051 km3y-1 lower layer: 0.6-866 km3y-1in northern exit of the strait, upper layer: 0-1216 km3y-1 lower layer: 0-654 km3y-1in southern exit of the strait).