



Turkish Straits System and Southern Black Sea: Exchange. Mixing and Shelf / Canyon Interactions

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Based largely on an experiment employing high-resolution measurements carried out in June-July 2013 and re-interpretation of past experiments, the oceanographic variability of the exchange through the Turkish Straits System (TSS) and the interactions with the southern Black Sea are revealed through CTD, ADCP, oxygen and light transmission measurements. The exchange flow is primarily governed by the complex topography spanning two narrow straits, wide continental shelf regions, steep slopes and numerous canyons connecting deep basins. Water properties and currents in the high energy environment depends on the mosaic of fine-scale processes and pathways. The TSS, often approximated as a two-layer system has a hydraulically controlled, upper ocean and straits intensified regime, leading to surface jets and bottom plumes participating in mixing and renewal processes. The exit of the 'Mediterranean effluent' onto the Black Sea past a sill overflow from the Bosphorus passes through two subsequent hydraulic jumps and proceeds along a narrow canyon that veers to the west clear of the greater Bosphorus Canyon finally cascading down the few small canyons. A diffusive spread from the bottom vein of salty water reforms to the east and spills down the Bosphorus Canyon. The suspended particulate signature of the cascade, as well as its influence in hydrography is traced over the shelf and slope waters and through the numerous canyons into deep water where the reformed flow is found to sustain signatures of the past evolution of intrusive waters. An evaluation of the processes is given with reference to model development carried out in parallel to the analyses of the measurements.