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Water mass distribution and formation processes in the Aegean Sea

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Four years of CTD surveys and profiling float measurements were conducted in various Aegean Sea basins, supplemented by numerical model experiments, in order to monitor the circulation and stratification of the complex environment in the Aegean Sea. There is a remarkable difference of the Θ-S characteristics between the north and south Aegean sub-basins. At the surface layers the large differences can be attributed to the presence of BSW in the northern basin, while in the south Aegean the surface waters are influenced by the warmer and more saline waters of Levantine origin. The general cyclonic circulation in the Aegean disperses this water masses in a counter clock wise sense, creating a strong thermohaline front at the northeastern part of the basin. The deep-water Θ-S differences are also important, indicating a possible intermittent decoupling of the two sub-basins. The X-shape Θ-S diagram of the Aegean Sea denotes the importance of the central Aegean triggering the intermittent circulation across the several sub-basins. The central Aegean seems to play a key role in the water mass formation processes, for the entire Aegean basin, as it is indicated by earlier studies. Local water mass formation processes detected during the two cruises carried out abroad the R/V Aegaeo in the winter periods of 2005 and 2006 are evidence of the dense water mass formation, with densities $\sim$29.2, was detected and attributed both to shelf and open ocean convection. These water mass formation processes, together with sea water characteristics (Θ-S-O_2) analysis strongly support the idea that central Aegean waters act as the connector in the basin-wide thermohaline cells. It is the combination of the high salinities of the surface waters reaching the central basin with the enhanced winter buoyancy loss that makes this area favorable for dense water formation.