

Deep Water Formation in the Aegean Sea

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The hypothesis for the deep water formation of the Athos and Chios basins, as result of the deep convection mixing in the open sea areas, cannot explain the existence of water with potential density σ_{θ} 29.35 - 29.40, which fill the deep cavities of Aegean Sea.

Recent studies of the Aegean deep sea water has been done, only during the second half of the 1980th decade working separately, the soviet R/V "Jacob Gakkel" as well as the greek R/V "Aegaeo".

The observations in March 1987 (Theocharis, Georgopoulos 1988 & Georgopoulos, Theocharis, Zodiatis, Christianidis 1988) and in February and March 1988 (Gertman, Popov 1989) shows that the formed dense waters (29.37-29.38) east of Limnos island move sliding toward the Skiros hollow (29.35-29.42) and fill it. Then through the deepest trough in the area are spread to the south-southeast, to the deep cavities of Chios basin and in certain cases even reaching the Cretan basin.

Displacement of the thermochaline front between the waters, originating from Black Sea and Levantine Sea towards the north ($\theta=40$), create the possibility to the dense water to flow towards the Athos basin through the passage between Imvros island and peninsula Kallipolis. At this area the dense water of the shelf carried away in the bottom layer by the northern currents. Further displacement of the front to the north permits the deep water formation to occur in the Athos basin, at the northern side of the crest between the islands Limnos and Imvros. Deep water with this origin characterized by smaller values of temperature and salinity in the north deep trough than those of Skiros ($T > 0.30$ deg. C, $S > 0.15$ psu), while the density is approximately the same.

The deep water formation of the Athos and Chios basins in the shelf of Limnos can be seen at the horizontal distribution of potential density in the bottom layer of Aegean Sea (Fig. 1, R/V Jacob Gakkel, January-February 1990). It is necessary to mention the predominance of the deep water formation in the shelf, which characterizes mainly the north part of Aegean Sea. In the Cretan Sea, as well as in other areas of Mediterranean Sea, the deep water is formed mainly by convection mixing in the open sea at the centre of cyclonic gyres. In the eastern part of the Cretan Sea was found water originating from Chios basin, while in the western part appears the influence of dense water which is coming sliding from the shelf zone of north Cyclades islands.

As it seems from the above results, it is attracted to shed more light on these phenomena, so combined efforts would help greatly to approach successfully such a problem.

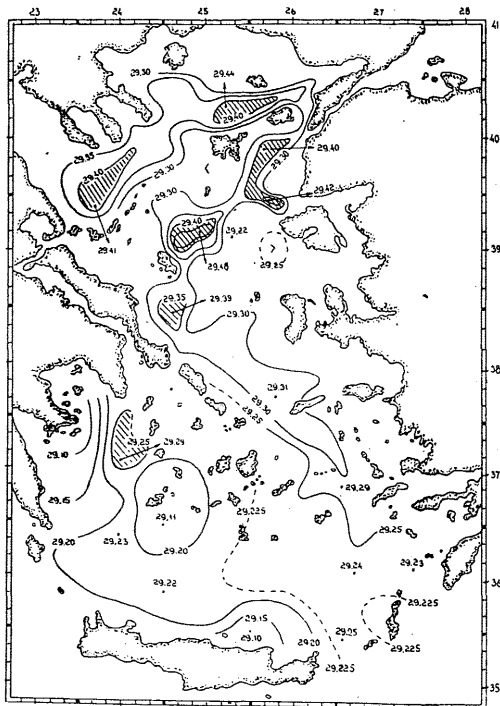


Fig. 1. The distribution of potential density (σ_{θ}) near the bottom in the Aegean Sea (R/V Jacob Gakkel).

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