SINKING OF THE LEVANTINE INTERMEDIATE WATER IN THE TYRRHENIAN BASIN

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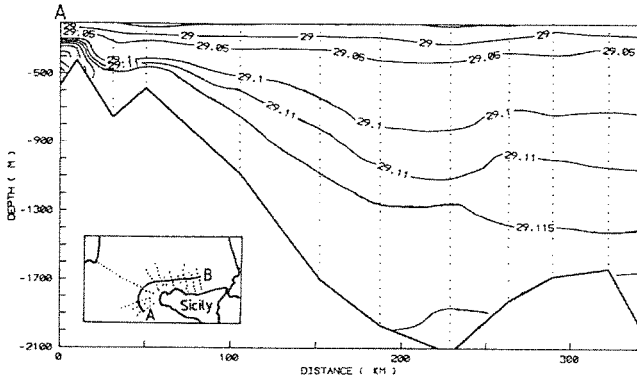
The Tyrrhenian Basin is a semi-enclosed basin whose most important opening is the Sardinia- Sicily cross-section. The Levantine Intermediate Water (LIW) inflows only through this passage, along the Sicilian coast (KRIVOSHEIA and OVCHINNIKOV, 1973).

Intensive hydrographic surveys and long term current measurements in the Southern Tyrrhenian basin permitted to evidence a direct connection between the LIW outflowing from the Strait of Sicily and the LIW water entering the Tyrrhenian Sea. The current is characterized by a well developed mean flow entering the Tyrrhenian basin year round, but with higher values during the cold season. While a part of it flows at the canonical depth for this type of water, a considerable volume was seen to sink from about 300 m at the sill strait to more than 1800 m of depth, where it follows the isobaths and can be clearly observed as far as the Eolian Isles. This vein was observed in different seasons and its characteristics can be considered largely stable year round.

In the Sicily channel, the LIW has a σ_θ of about 29.10 or more, while in the Tyrrhenian sea, at the same depth (300-400 m), σ_θ ranges between 29.00 and 29.05. Thus, the LIW originated in the Rastern Basin, is denser than the resident Western Mediterranean Water. Once in this basin, it settles down at a level (1800-1900 m of depth), that is determined by the relative densities of the waters. The progressive deepening of the LIW along the principal route from the Strait of Sicily to the Tyrrhenian Sea, can be observed in the isotherms, isohalines and isopycnes evolution. In particular, the isopycnes clearly tend to follow the bottom slope (Figure). This process appears to be similar to the Mediterranean Outflow from the Strait of Gibraltar, which was seen to cascade along the Atlantic continental shelf (PRICE *et al.*, 1993).

The estimation of the physical parameters influencing the sinking of the LIW vein, like the density difference between the inflow and the local density, the current intensity, the bottom slope and the bottom friction, permit to give indications on the vein dynamics and on its mixing with the resident water. In particular, an important part of the mixing between the Levantine Intermediate Water and the Tyrrhenian Deep Water seems to happen in this very limited area.



Vertical cross-section of σ_θ from (A) the Sicily Channel to (B) the Tyrrhenian Sea

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