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THE EXISTENCE OF THE LEVANTINE INTERMEDIATE WATER IN THE GULF OF NAPLES

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The Levantine Intermediate Water (LIW) has been found repeatedly in water columns of the Gulf of Naples.

Since March 1975, the Stazione Zoologica has conducted 4 major hydrographic cruises of around 30 stations in a grid extending to 50km offshore. Since January 1976, they have sampled the >300 m water column in the Ammontatura canyon. This station is 10 km offshore. Temperatures and salinities were obtained either by a Bisset Berman 9060 STD or standard water sampling techniques or both. The water sampling served to calibrate the STD readings.

The existence of a salinity maximum of $38.65 \pm 0.05\text{‰}$ is clearly evident in deep casts (exceeding 700 m). The vertical temperature structure has a corresponding maximum of $14.10 \pm 0.05^{\circ}\text{C}$. These values identify the water type as LIW, according for example, to Wüst's (1961) T-S regression for the LIW. Fig.1 illustrates the water type similarity between an ATLANTIS station and two taken in the Gulf of Naples. The station 34 is the frequently sampled Ammontatura canyon station.

We define the LIW as exhibiting $> 38.6 \text{ ‰}$ salinities. In mid-July 1976 the minimum depth at which the LIW occurred was 190 m.

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The maximum occurred in mid-February 1976 at 300 m. The resolution is . 25 m for these estimates. The data suggests a seasonal trend. It is uncertain whether the shallower summer values reflect a larger LIW supply, or a reversal in the horizontal tilt of the LIW interface, or whether winter convective deepening causes this apparent subsidence of the upper LIW boundary. Winter convection produces a column homogeneity down to depths of 150 m, but at a water type of 14.0°C and 38.0‰ with a density (28.5 δ) considerably below that of the LIW (29.0 δ). Significant variations in the depth of the LIW upper bound also were observed at higher, than seasonal, frequencies.

Deep casts taken in April 1976 showed the LIW to occupy the 300 to 800 m depth range, with the exception of an STD cast south of Capri that failed to penetrate the lower limit of the LIW by 950 m. The depth of the salinity maximum averaged 550 m.

The temperature maximum was shallower at 350 m.

The oxygen values observed in the LIW were typically 4.2 ± 0.5 ml/l. The data indicate the oxygen minimum to be well below the LIW core. Deeper stations penetrating into the Tyrrhenian Deep Water will be required to evaluate the O_2 minimum, where O_2 values are reported to be 4.3 ml/l (MILLER et al., 1970).

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Caption

Fig. 1 . A T-S diagram comparing two Gulf of Naples stations (March 1975) with a Southern Tyrrhenian, ATLANTIS 275 station (March 1962).

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