RECENT OBSERVATIONS ON THE INTERMEDIATE WATER FORMATION IN THE NORTHERN LEVANTINE BASIN

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The cyclonic eddies of the Northern Levantine Basin (LBN) have been traditionally proposed to be a major source region of the Levantine Intermediate Water (LIW). The convective mixing process is known to be responsible for the formation of this homogeneous water mass in the upper 300-400 m of the water column, in response to large heat loss from the ocean associated with the intrusion of outbreaks of cold and dry continental air masses over relatively warmer surface waters.

Recent quasi-synoptic, hydrographic surveys carried out during March 1989 and March 1990 in the NLB, however, indicate that the formation of LIW actually takes place only in warm core eddies. A series of quasi-permanent anticyclonic eddies, which act as pools of LIW throughout the year, appear to have higher salt content, and receive a greater rate of winter-time cooling than the cyclonic eddies. Thus, convection occurs in these eddies whenever the region becomes subject to sufficient amount of cooling, such as during the February-March period. A one-dimensional mixing model forced by the surface thermohaline fluxes provides quantitative evidence for the formation of homogeneous Hing-salinity and Hing-oxygen layers within the warm core eddies of the NLB.

MARCH 1989 Station Positions

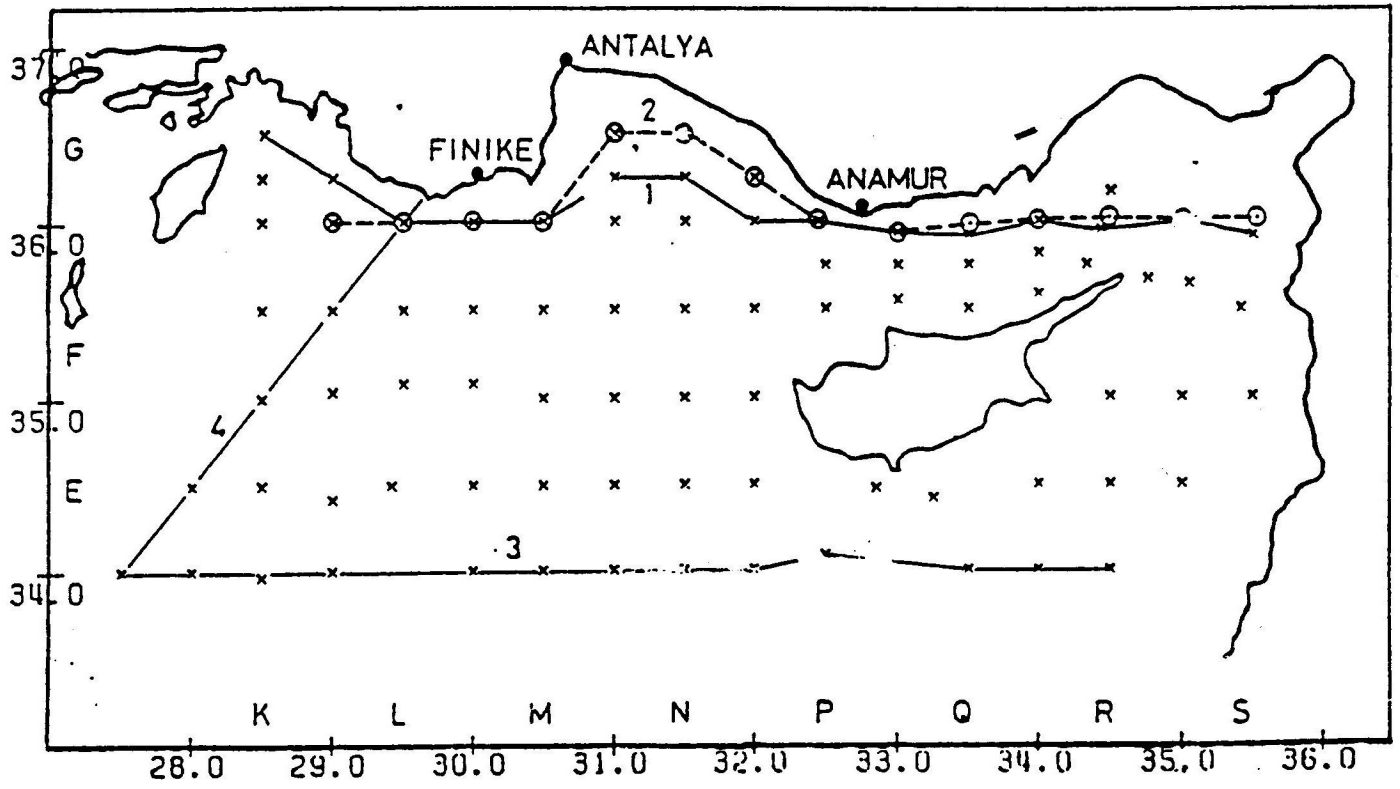


Fig. 1 The location map of the Northern Levantine Basin, and the position of hydrographic stations visited during 3-18 March 1989 and 14-18 March 1990 surveys. The locations of coastal meteorological stations and the tracks representing the temperature and salinity sections are also indicated.

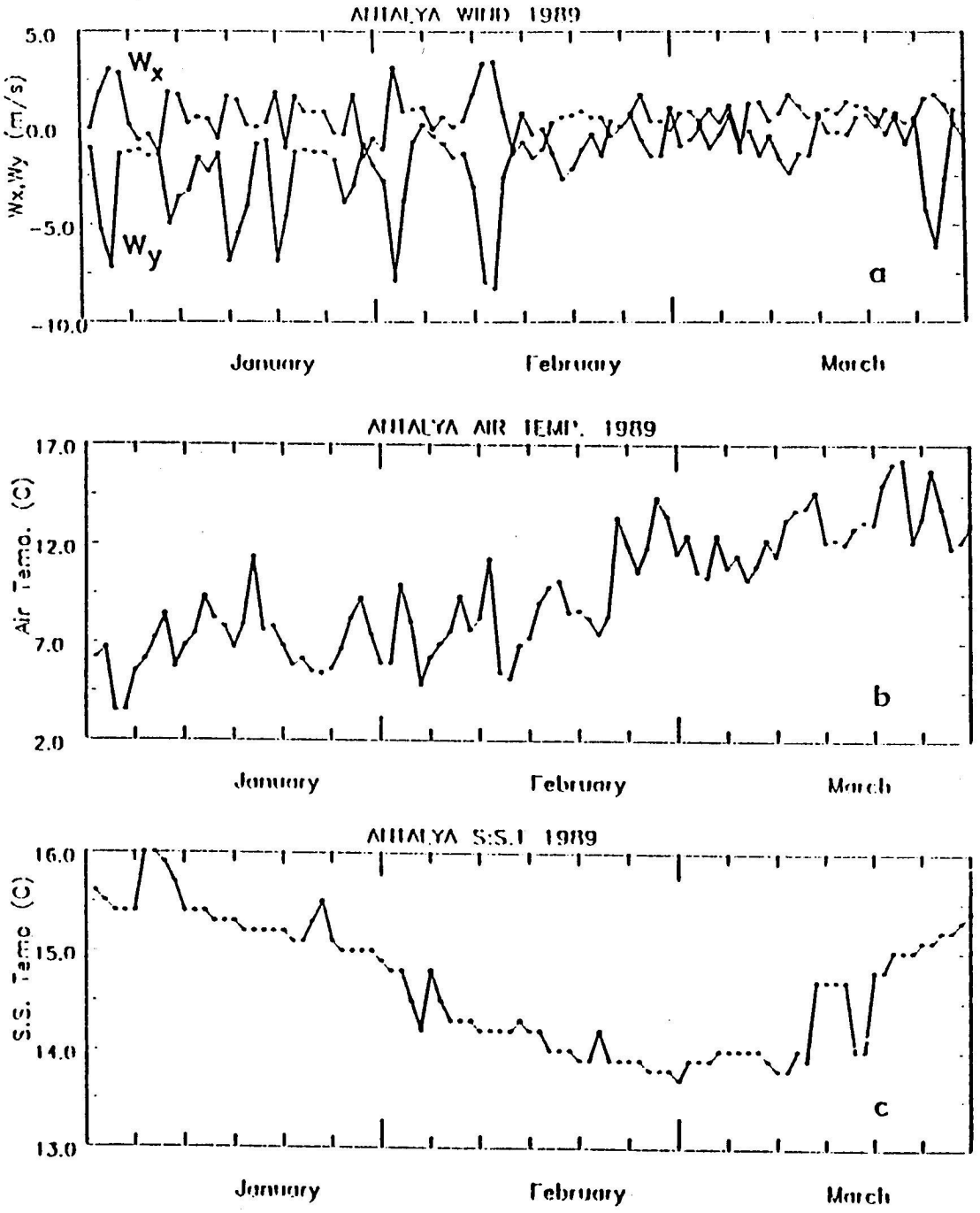


Fig. 2 Time series of (a) the daily-average x and y components of the wind vector, (b) air temperature, (c) sea surface temperature measured at Antalya meteorological station for January-March 1989 period. Positive values of W_x and W_y denote the wind components from the west and south, respectively.

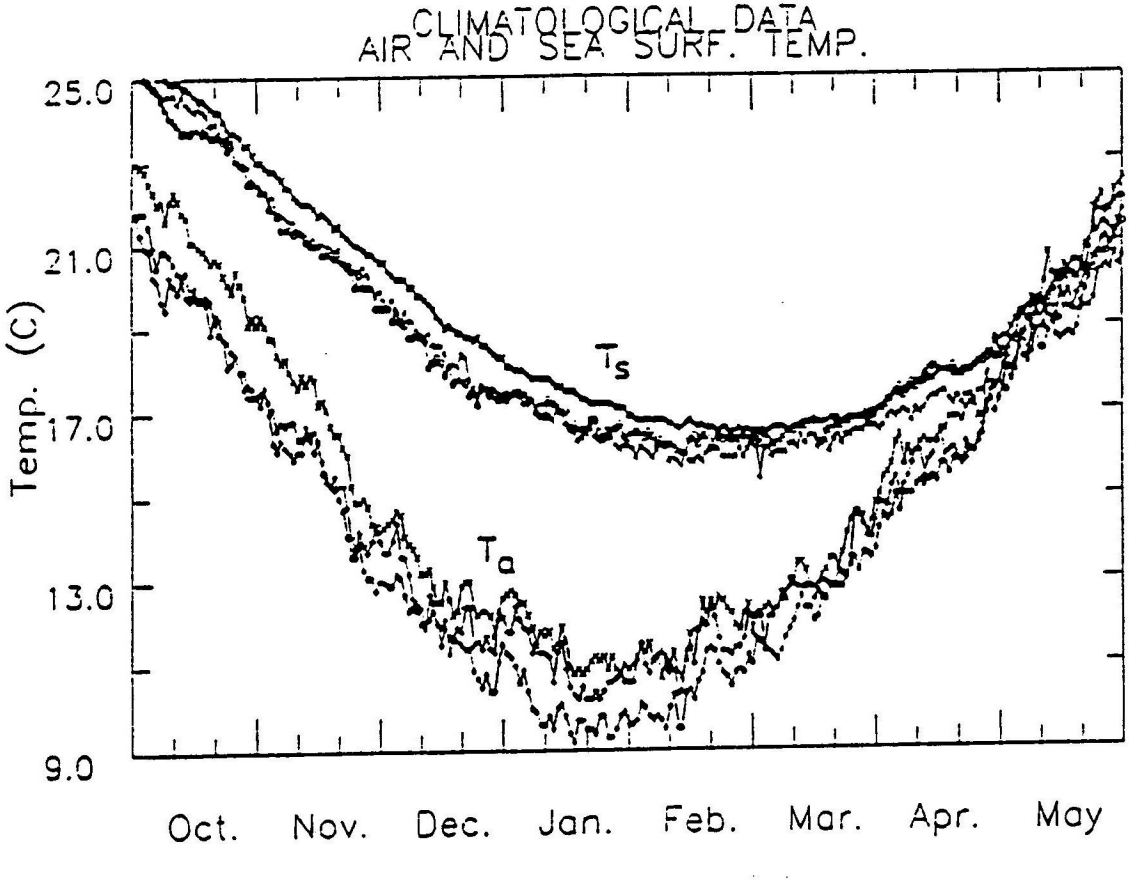
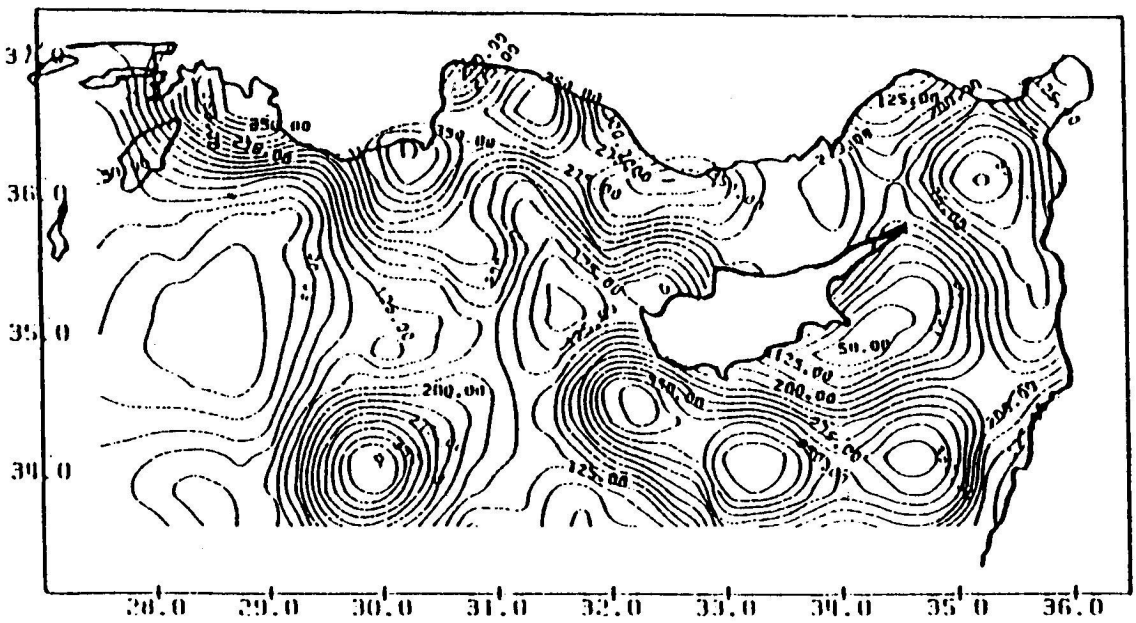


Fig. 3 Climatological (long-term average) daily sea surface temperature (T_s) and ait temperature (T_a) variations for October-May period at Finike, Antalya and Anamur meteorological stations. The locations of stations are indicated in Fig. 1.



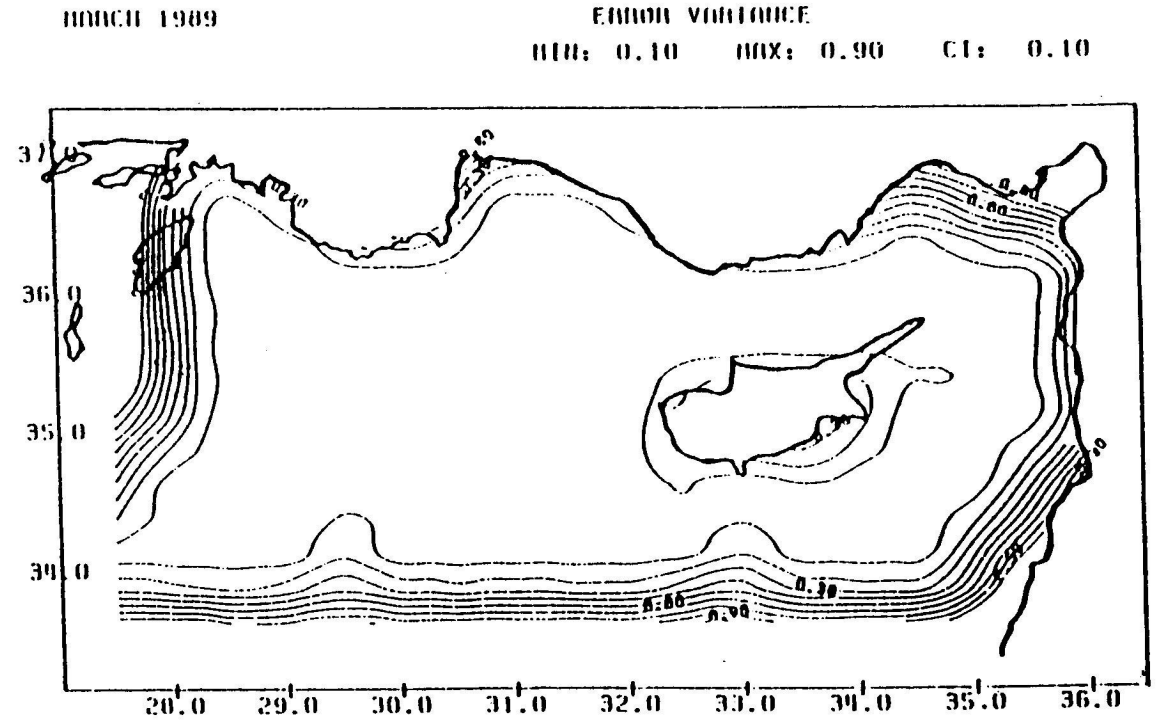


Fig. 4 (a) The objectively analyzed map of the 15 °C temperature surface, and (b) its normalized error variance map for March 1989 data.

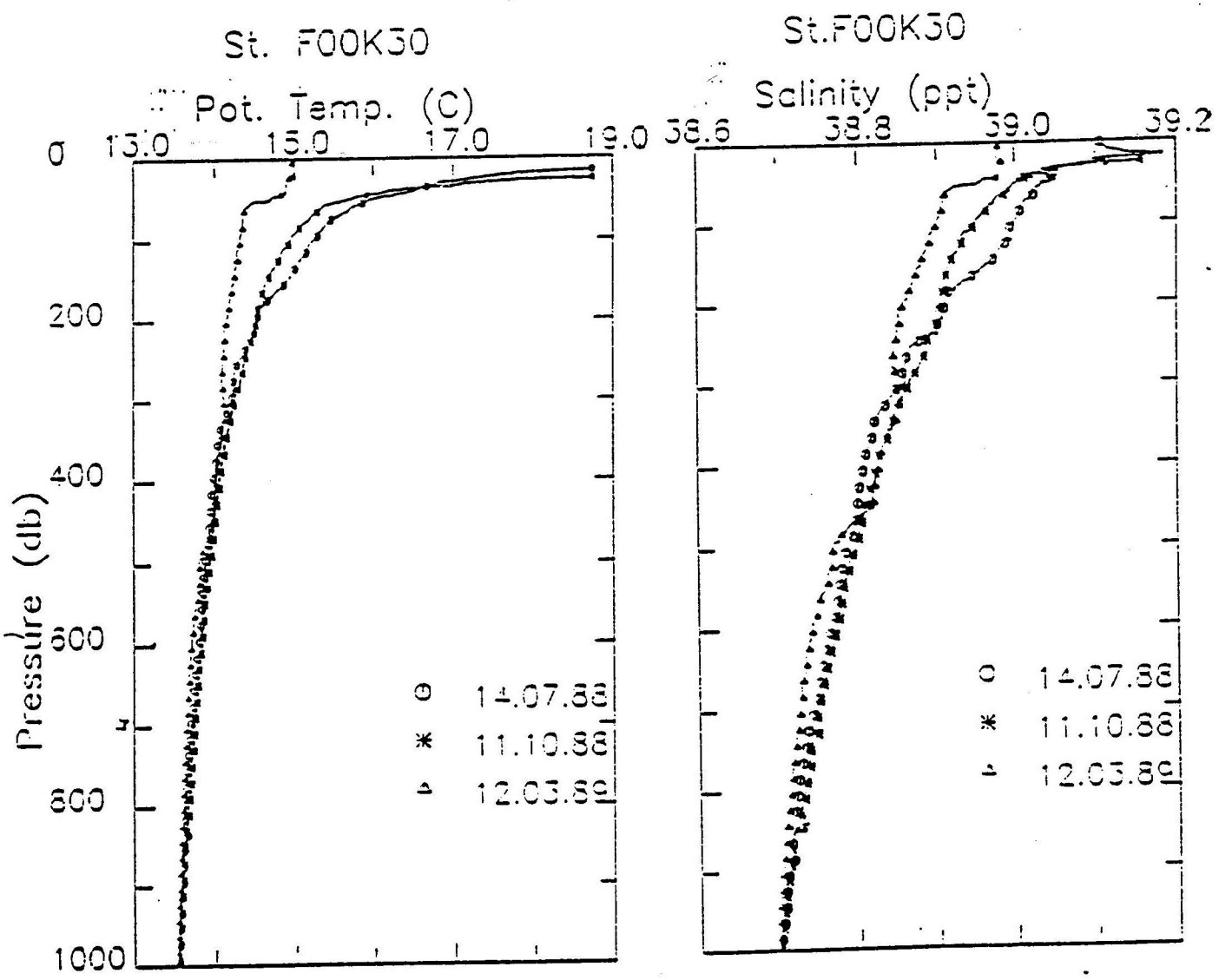


Fig. 5 The observed vertical profiles of the temperature and salinity at station F00K30 situated within the quasi-permanent Rhodes cyclonic region at different times of a year.

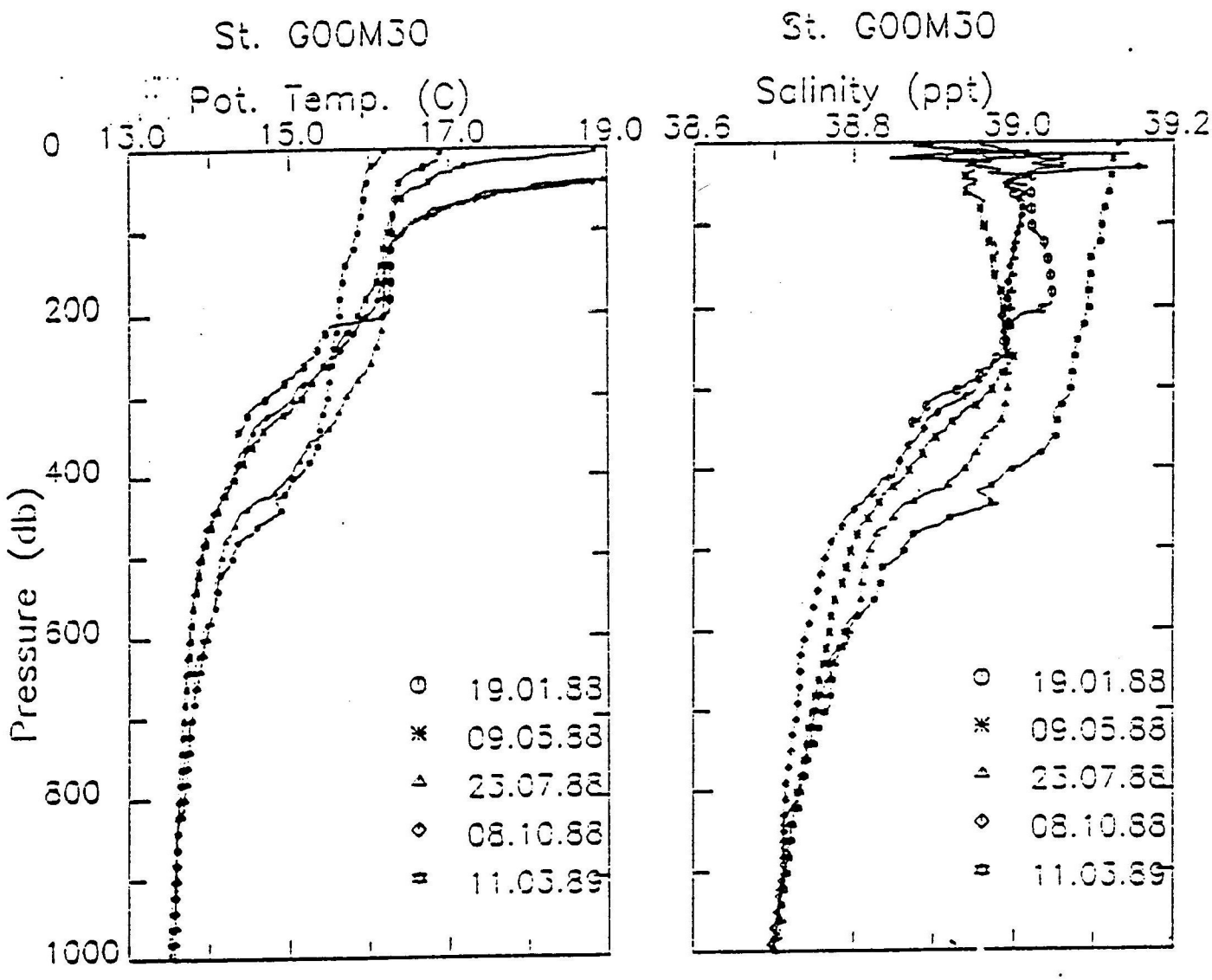


Fig. 6 The observed vertical profiles of the temperature and salinity at station G00M30 situated within the quasi-permanent Anaximander anticyclonic region to the west of the Gulf of Antalya at different times of a year.

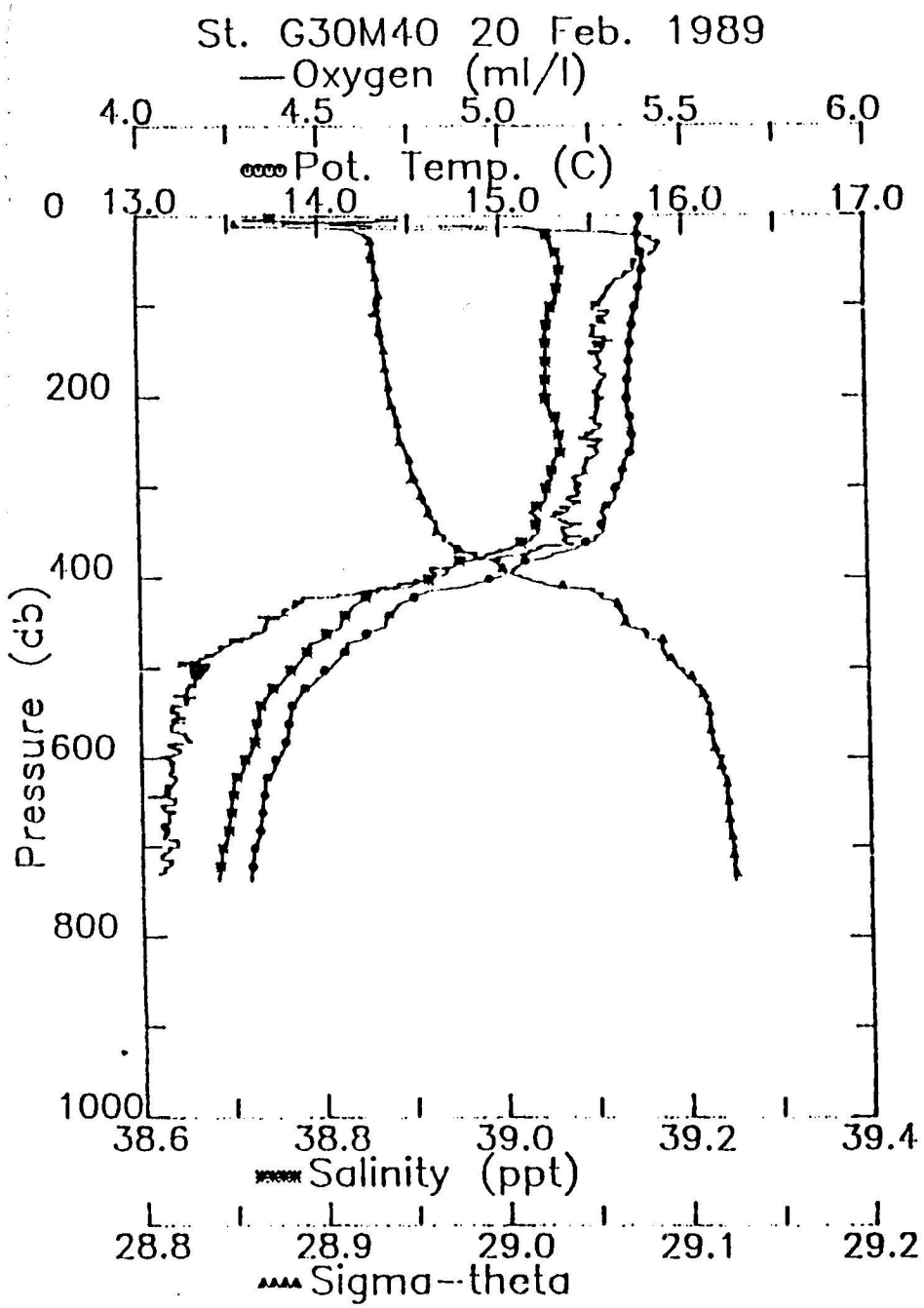


Fig. 7a The temperature, salinity, density and oxygen profiles at station G30M20 (36°30'N, 30°20'E) during 20 February 1989.

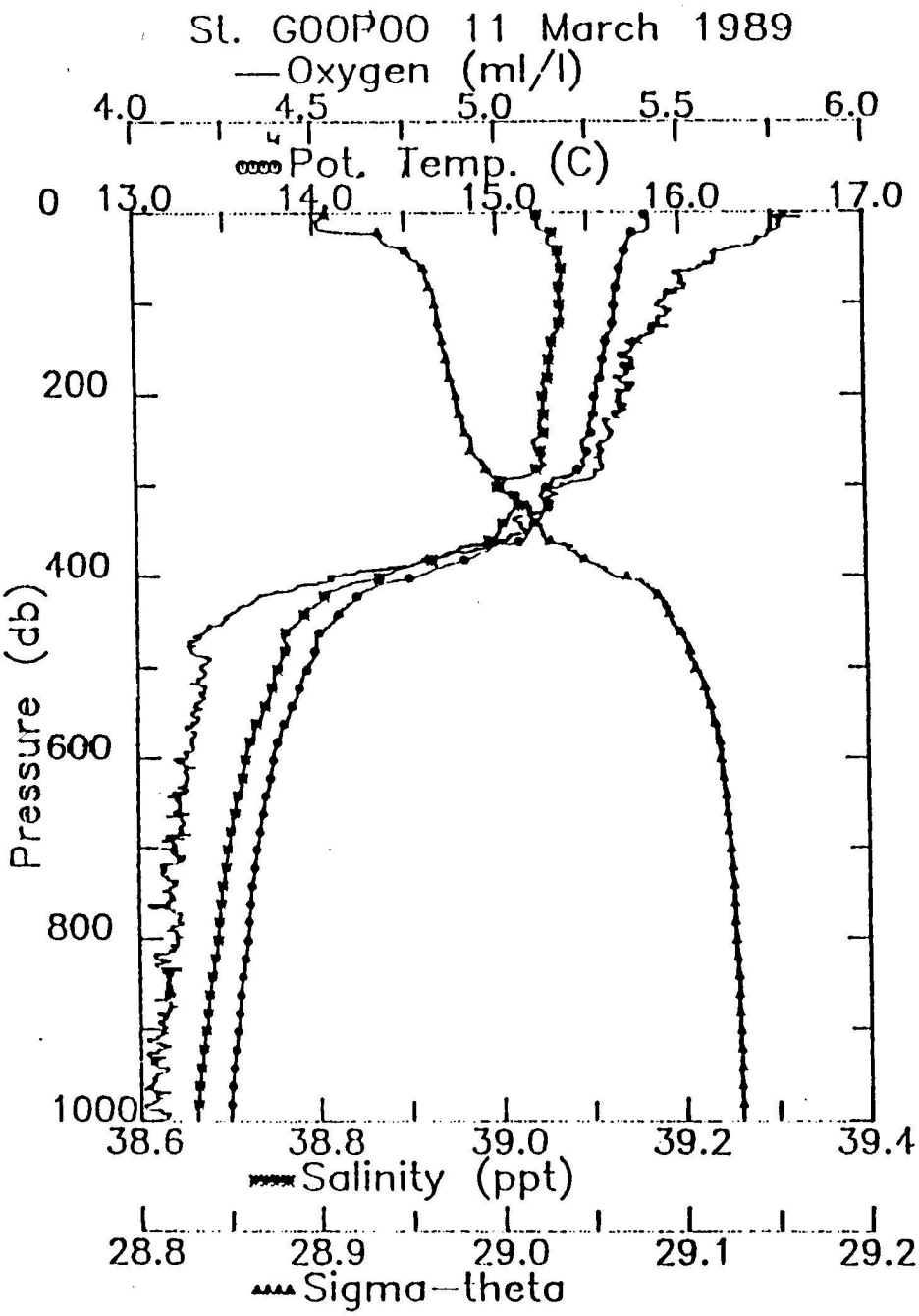


Fig. 7b The temperature, salinity, density and oxygen profiles at station G00P00 (36°00'N, 32°00'E) during 11 March 1989.

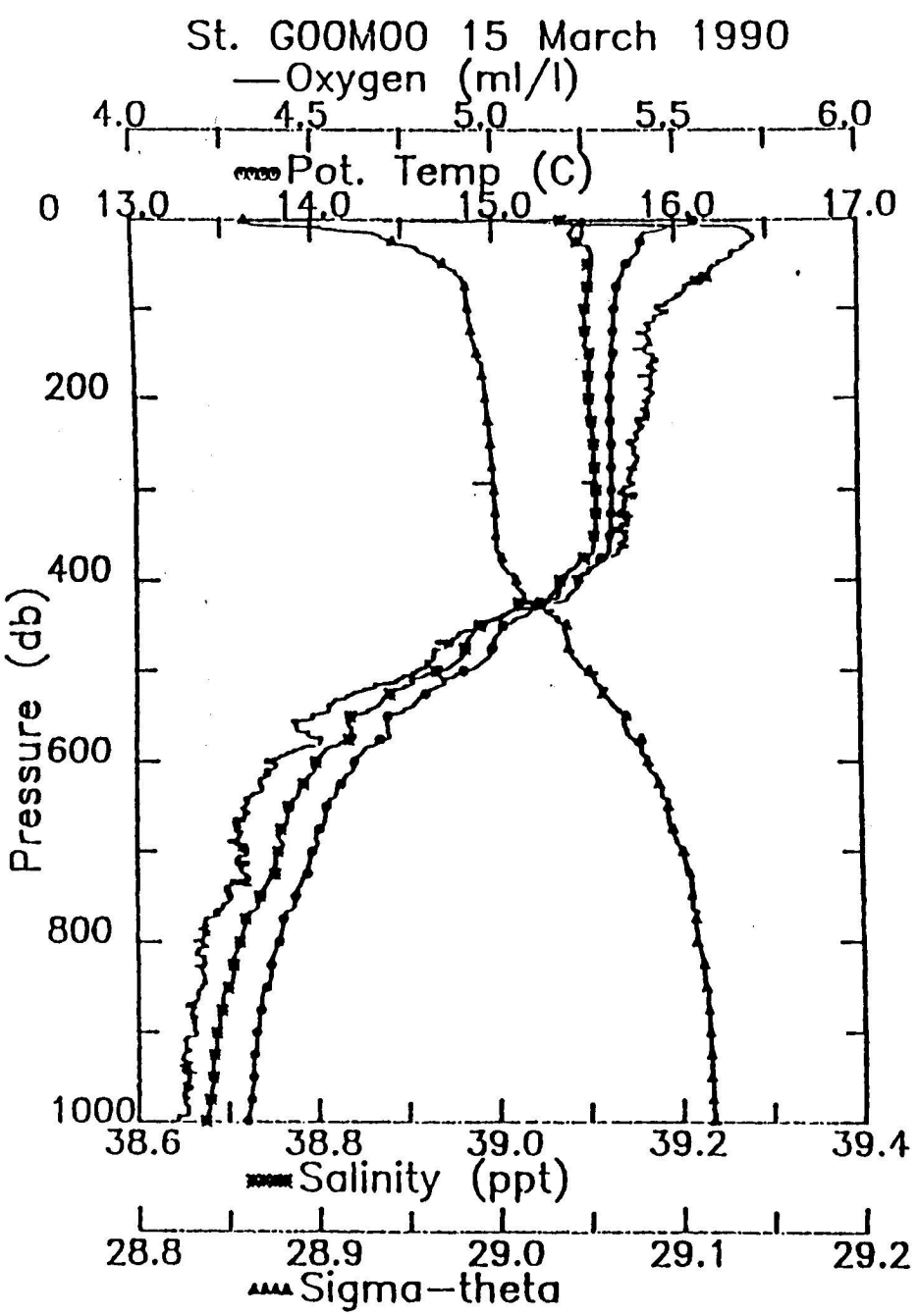


Fig. 7d The temperature, salinity, density and oxygen profiles at station G00M00 (36°00'N, 30°00'E) during 15 March 1990.

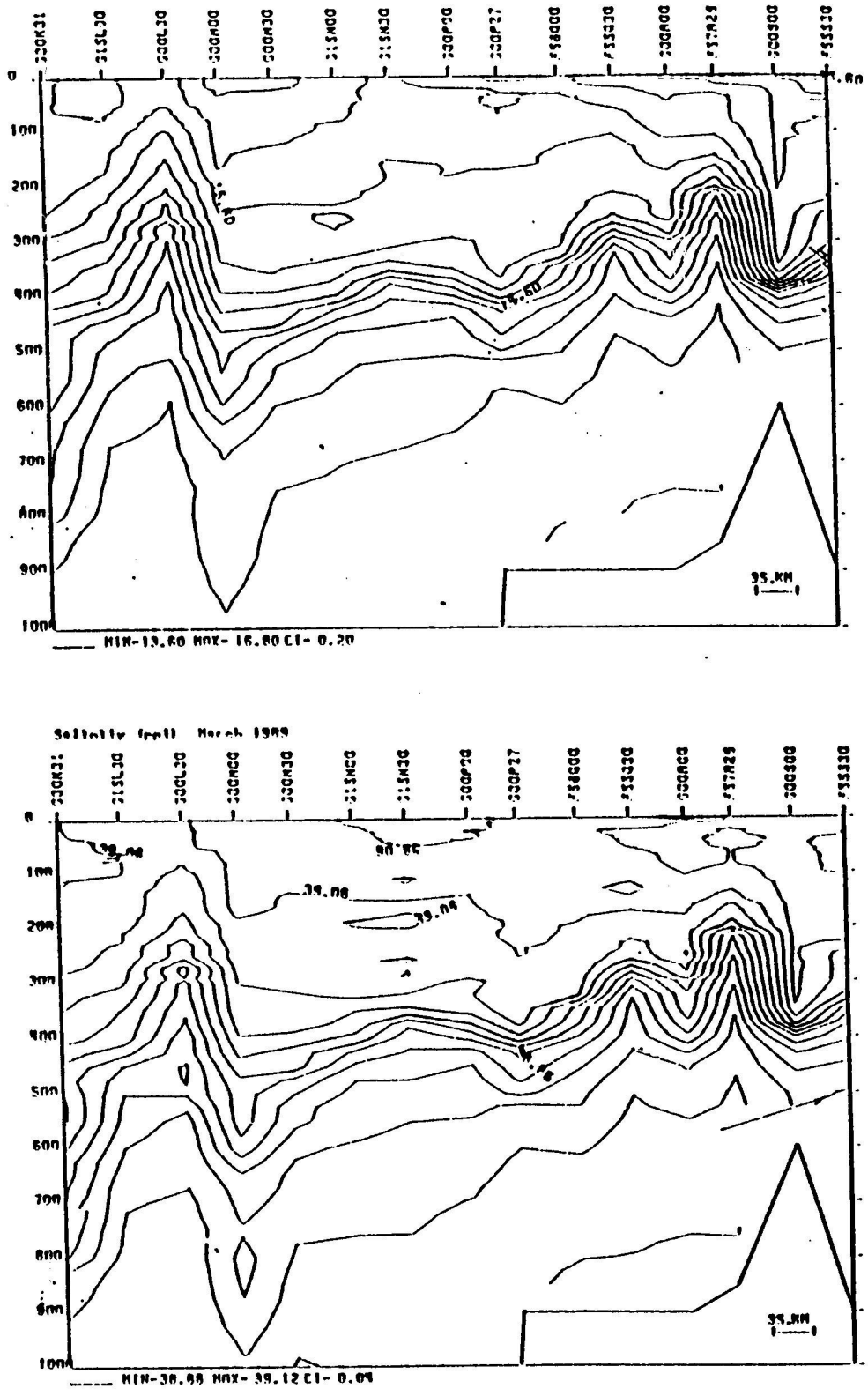


Fig. 8 (a) temperature (above), (b) salinity (below) cross-sections along the southern Turkish coast (Track 1) during March 1989.

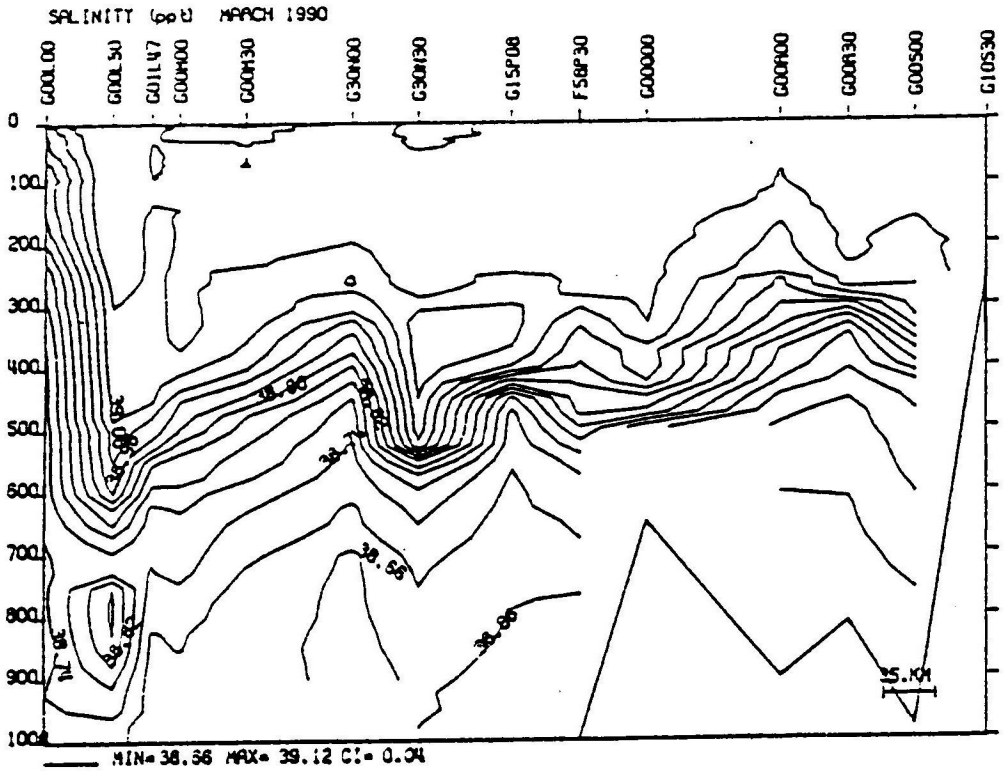


Fig. 9 Salinity cross-section along the southern Turkish coast (Track 2) during March 1990

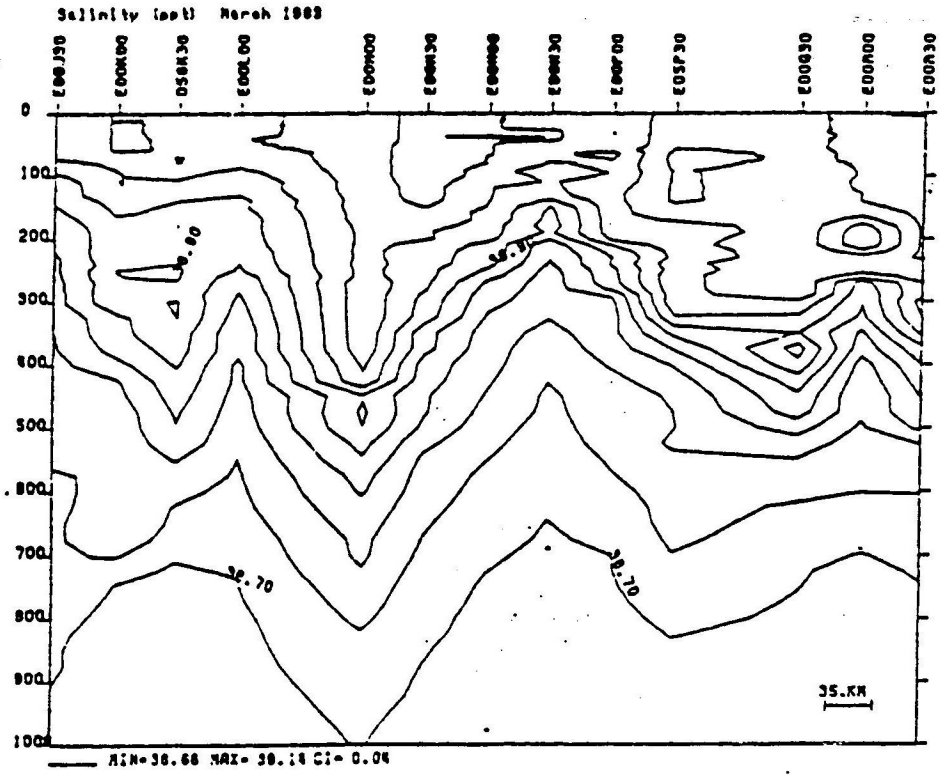


Fig. 10 Salinity cross-section along the latitude of 34°N (Track 3) during March 1989

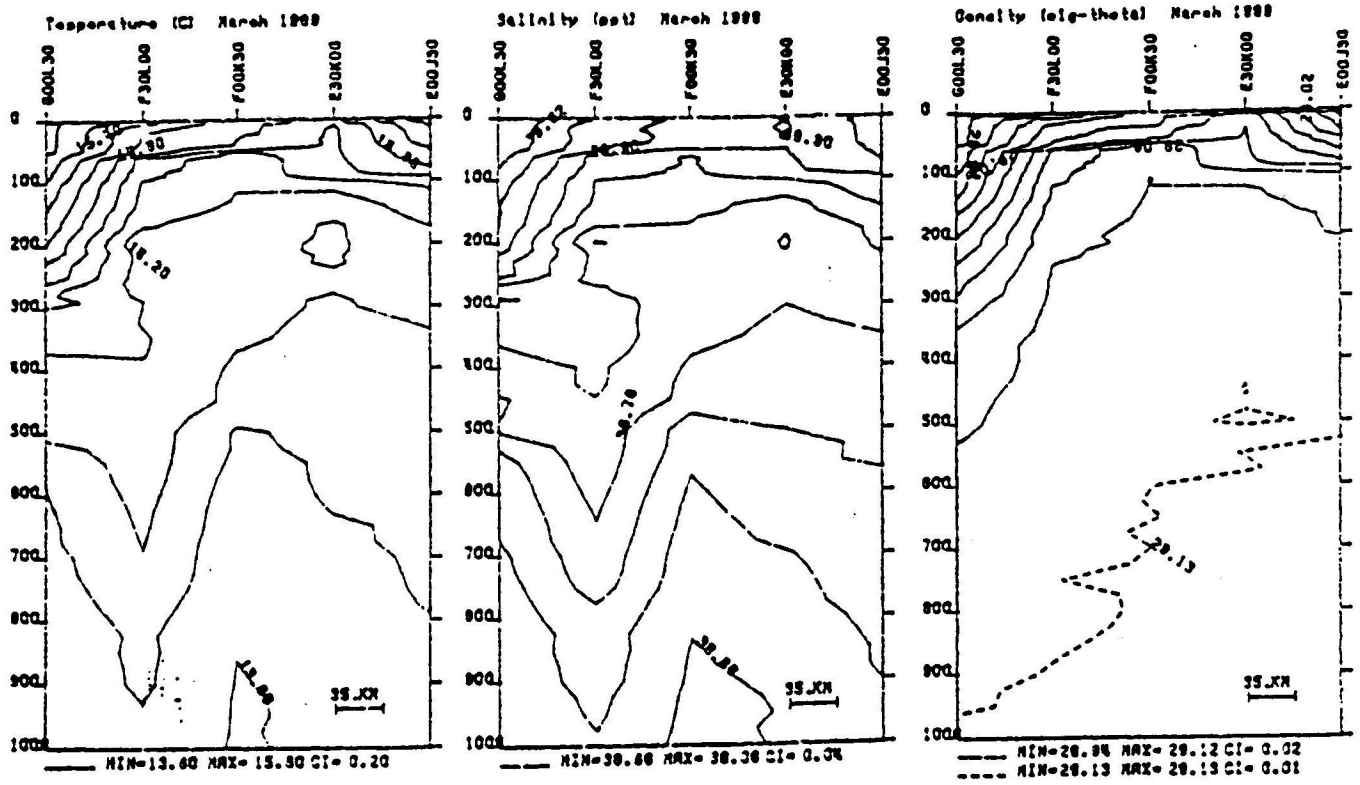


Fig. 11 Temperature, salinity and density cross-sections across the Rhodes gyre (along Track 4 in Fig. 1) during March 1989.

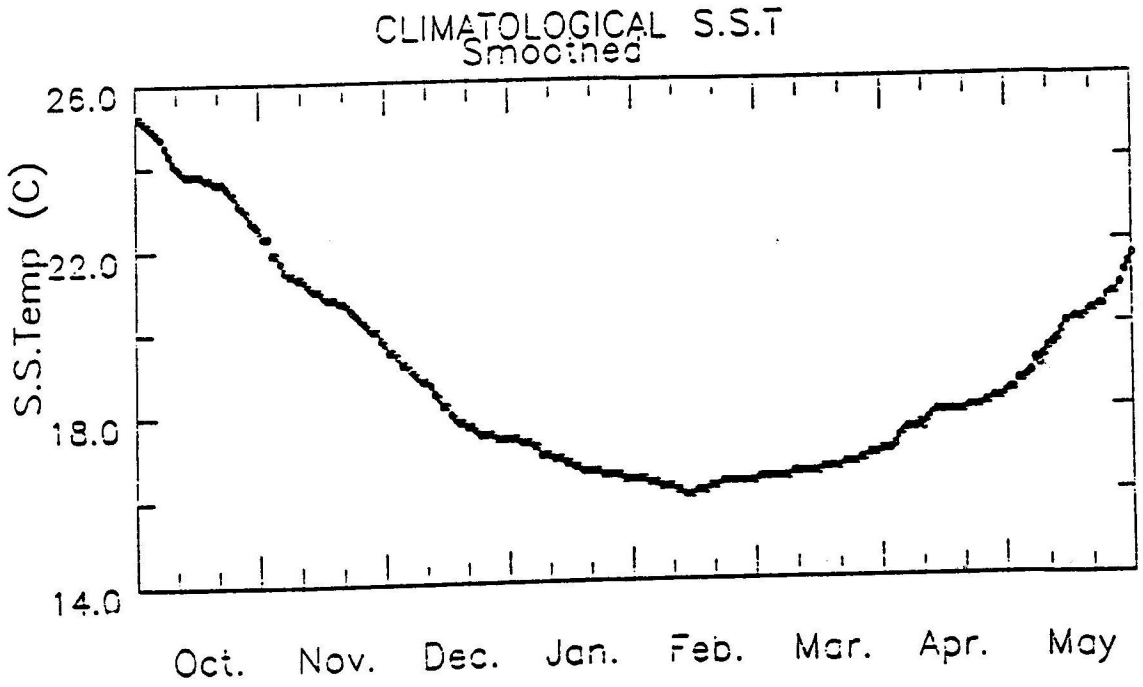


Fig. 12 Smoothed climatological (long-term average) sea surface temperature variations at Finike for October-May period. The location of the measurements is indicated in Fig. 1.

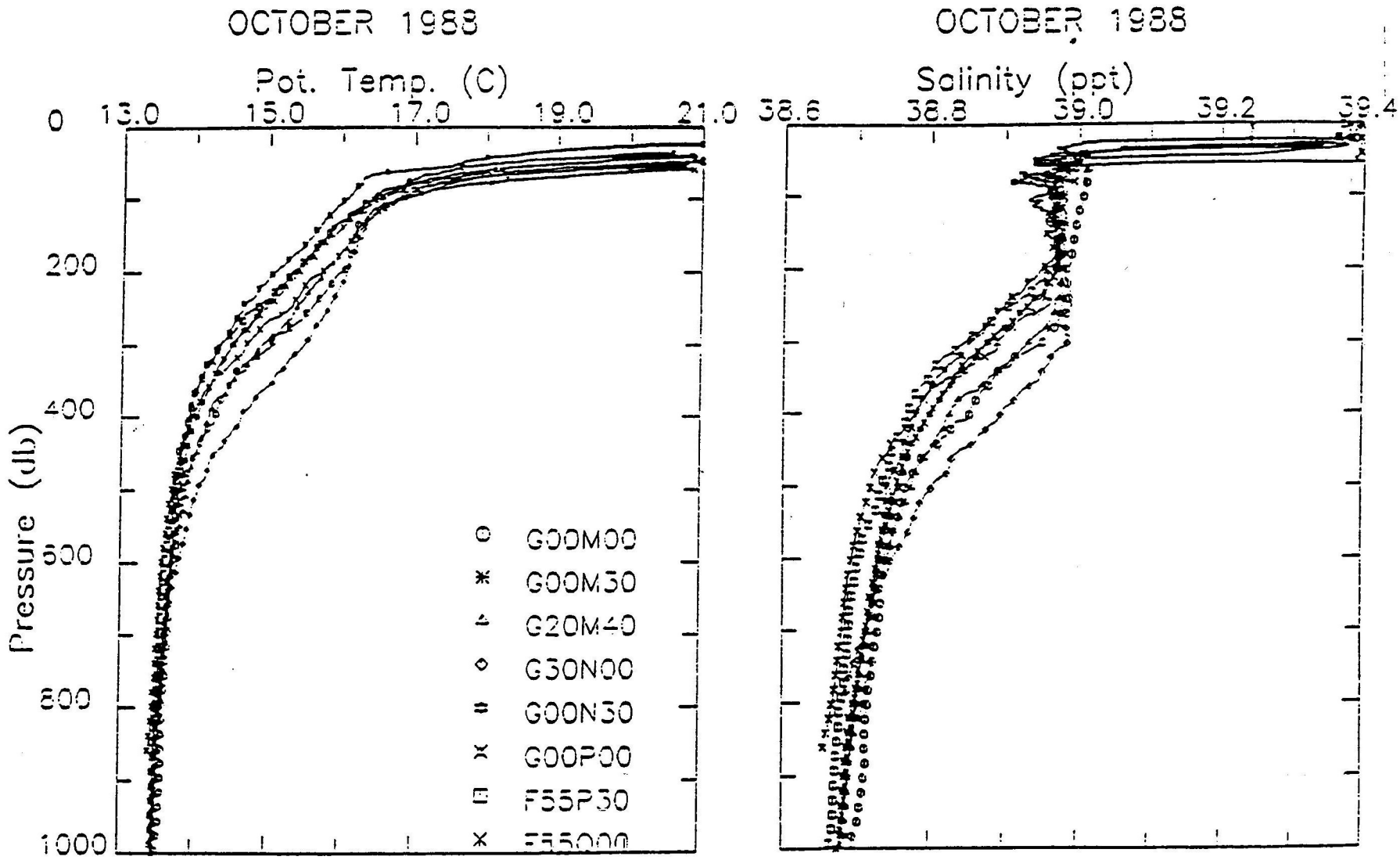


Fig. 13 The observed vertical profiles of temperature and salinity at selected stations within the Gulf of Antalya during October 1988. The averages of these profiles will be used for prescribing the initial conditions in the model.

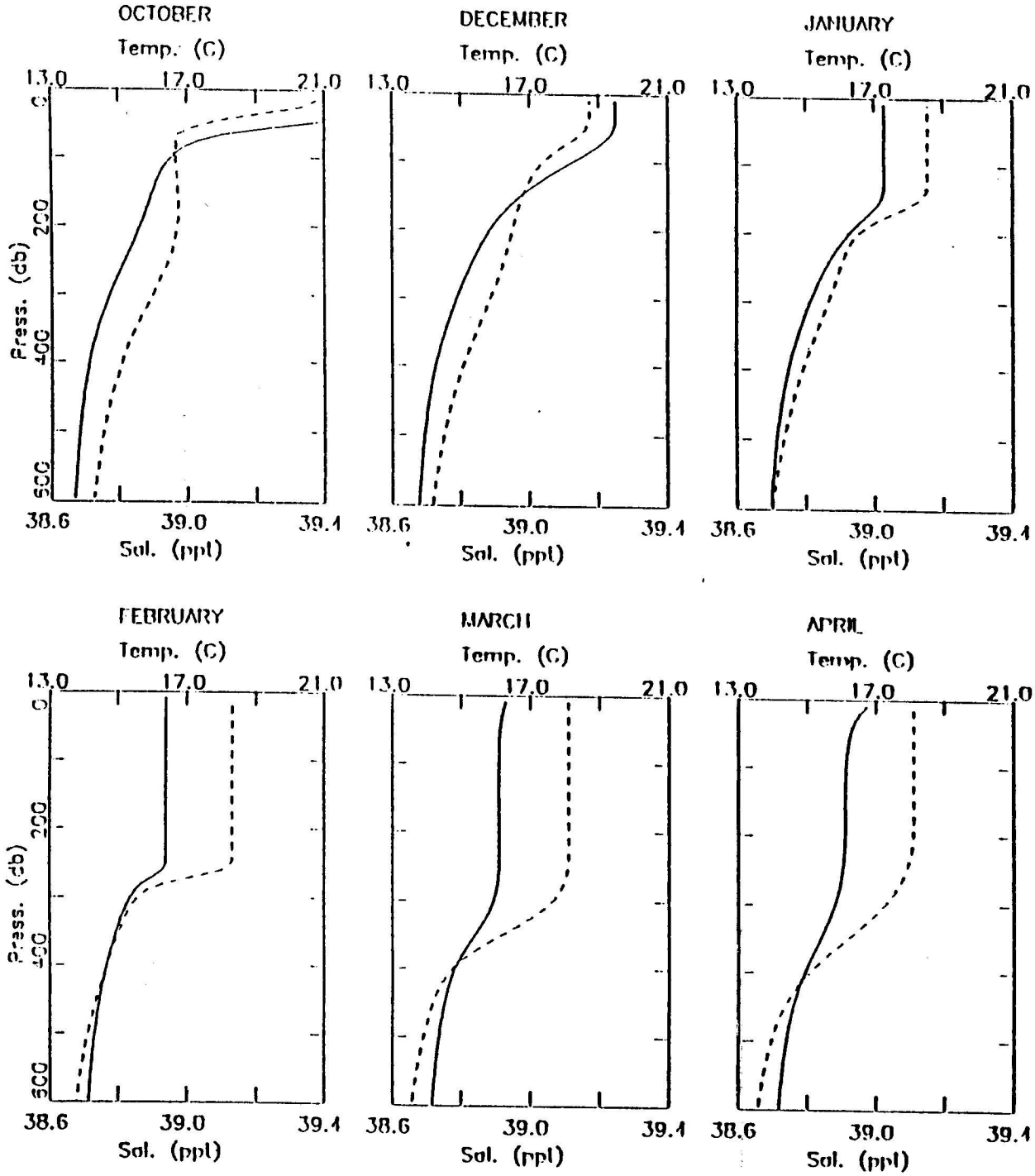


Fig. 14 The computed profiles of temperature (continuous line) and salinity (broken line) describing the mixed layer development for the period of October-April in the anticyclonic eddies of the NLB. Profiles correspond to the middle of each month

FOURTH POEM SCIENTIFIC WORKSHOP

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27 August — 1 September 1990