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Observations of Currents and Temperature on the Adriatic Shelf in Summer

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Current and temperature data were collected between 12 August and 10 September 1989 at three stations near the north-eastern Adriatic coast, in the framework of Adriatic Scientific COoperation Programme (ASCOP). Time series have been low-pass filtered in order to remove inertial and tidal oscillations. The low-passed data provide information about residual and wind-driven dynamics of the North Adriatic in summer.

The main feature of the current time series is variability at time scale of about ten days. Therefore, the analysed one-month period has been divided into three nearly equal subintervals with almost constant direction of current vectors. For each subinterval residual currents have been calculated and are presented in Figure 1. They indicate the existence of cyclonic gyre in the northernmost part of the Adriatic Sea. In the southern part of the measurement polygon anticyclonic gyre is observed at the beginning of the experiment, whereas cyclonic gyre is found there at the end of the experiment.The latter circulation pattern, consisting of two cyclonic gyres that dominate the open Adriatic waters, is typical for the summer period (Orlić, 1989). Present current records suggest shifting of the gyres at the time scale of about ten days. A similar phenomenon has been observed by Italian researchers in the north-western part of the Adriatic Sea. Some evidence for such a current variability in the summer 1979 is presented by Michelato (1983) and analysed in a modelling framework by Malanotte-Rizzoli and Bergamasco (1983). Accerboni et al. (1989) have reported on the similar current variations in the summers of 1983 and 1984.

During the analysed measurement interval only two wind episodes have been recorded (each lasting for about a day). Consequently, measured variations in circulation pattern may be attributed to thermohaline forcing, as was also pointed out by Malanotte-Rizzoli and Bergamasco (1983) for the summer 1979. Alternatively, such a variability can be interpreted in terms of baroclinic waves propagating through the North Adriatic.

The two wind episodes have generated response which has considerably changed current field for a short period of time. Temperature records at three analysed locations have shown that both wind episodes induced vertical mixing and appreciable decrease of surface water temperature.

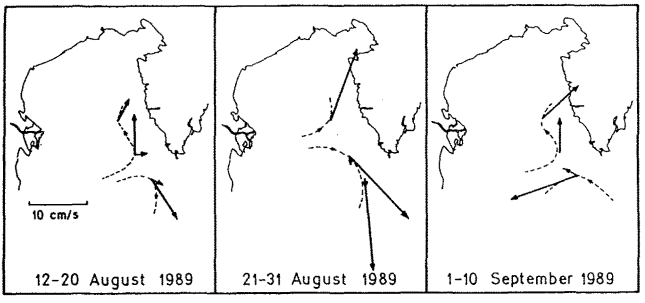

Figure 1. Surface (——) and bottom (——) residual currents and schematic representation of streamlines (---) in the North Adriatic during the summer 1989.

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