UNUSUAL THERMOHALINE SEASONALITY IN THE MIDDLE ADRIATIC COASTAL WATERS (OCTOBER 2002-SEPTEMBER 2003)

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Abstract
Intensive experiment with weekly CTD measurements in the middle Adriatic coastal area was carried out from October 2002 until September 2003. The first outlook of temperature and salinity space and time variability, together with departures from typical climatology of the area is presented.

Keywords: thermohaline, coastal water, Adriatic Sea

Introduction

The middle Adriatic area has strong temporal variability of thermohaline structure caused mainly by air-sea interaction, river discharges, mixing and seasonally dependent circulation (1). In the middle Adriatic coastal zone fresh water provides a strong buoyancy source, while in the wider shelf-sea freshwater influence is dispersed. The ADRICOSM (2) research area is pointed as a region where fresh water input from the eastern Adriatic coast is observed, especially from the Cetina and Neretva rivers, whereas in the offshore waters, influence of the northern Adriatic rivers during the stratified period might be significant. Spring and summer 2003 were warmer and drier than usual, causing high temperatures and salinities with strong departures from the local climatology.

Research area

Intensive be-weekly and weekly CTD profiling was carried out in the period between October 2002 and September 2003 at 14 stations in the channel area of the eastern middle Adriatic (Fig. 1, stations denoted by circle). Collected data set had good space and time coverage for comparison with general thermohaline climatology of the region.

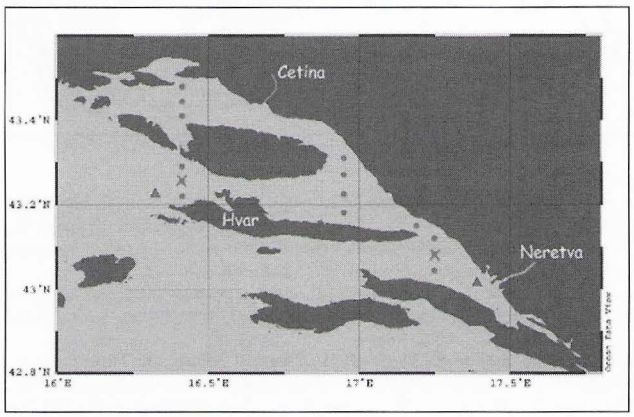

Fig. 1. Location of CTD stations in ADRICOSM research area (denoted by circles) and climatological stations (denoted by triangles).

Climatology of the research area was obtained from temperature and salinity data collected between January 1961 and December 2000 in the offshore area in front of the west coast of Hvar Island and in the vicinity of Neretva estuary (stations denoted by triangles). Uniform salinity annual course has been found at depths up to 18 m at the near-coastal stations. Spring salinity minimum coincide with Neretva discharge maximum, whereas the second minimum in November is caused by extensive precipitation. At the offshore stations, beside the spring minimum, an additional summer minimum is observed in the surface layer (Fig. 2), probably caused by the spreading of low-salinity water from the north.

Preliminary results

Project goals were to reveal the mechanisms responsible for typical thermohaline variability and to determine the contribution of horizontal and vertical processes to the total heat and salt exchange. Spring and summer 2003 were warmer and drier than usually with strong evaporation and minimum precipitation, which resulted in exceptionally high salinity values at almost all stations. Temporal salinity changes obtained during the experiment show strong departures from typical annual cycle in which salinity follows E-P variability. Throughout the whole experiment strong positive trend in the salinity was observed (Fig. 2). As a consequence of intensive heating, sea surface temperatures became greater than long-term means. High temperature gradient was observed between shallow surface layer and layer bellow thermocline, which disappeared after an episode of bura wind in the mid-September.

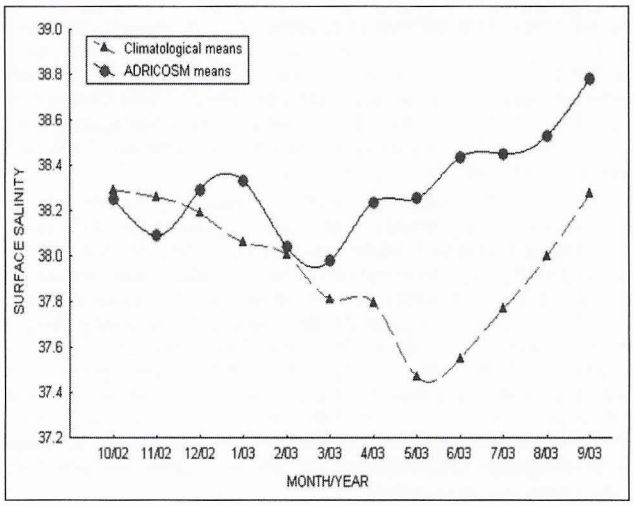

Fig. 2. Salinity monthly means for the station near the Hvar Island over the 1961-2000 period compared to the monthly mean salinities obtained in the Hvar channel during the ADRICOSM experiment from October 2002 to September 2003.

Acknowledgements. The contents of this article were developed under a financial support from the Istituto Nazionale di Geofisica e Vulcanologia, Italy, and funded under Italian Ministry for the Environment contract ADRICOSM

References

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