# EAST ADRIATIC CURRENT IN WINTER AND SPRING 2003

M. Orlic [1] *, V. Dadic [2], B. Grbec [2], N. Leder [3], G. Beg Paklar [2], D. Ivankovic [2], A. Marki [1], F. Matic [2], H. Mihanovic [3], M. Pasaric [1], Z. Pasaric [1], M. Pavic [1], I. Vilibic [3]

[1] Andrija Mohorovicic Geophysical Institute, Faculty of Science, University of Zagreb, Horvatovac bb, 10000 Zagreb, Croatia
* orlic@olimp.irb.hr

[2] Institute of Oceanography and Fisheries, Setaliste I. Mestrovica 63, 21000 Split, Croatia

[3] Hydrographic Institute of the Republic of Croatia, Zrinsko-Frankopanska 161, 21000 Split, Croatia

**Abstract**

An experiment, comprising long-term ADCP measurements, repeated CTD profiling and meteorological data collection, was carried out between November 2002 and June 2003 in the east Adriatic coastal waters. Preliminary findings, particularly those concerning the spatial and temporal variability of the East Adriatic Current and its dynamics, are presented.

*Keywords: currents, buoyancy forcing, winds, Adriatic.*

## Introduction

It is well known that the Adriatic general circulation consists of currents flowing into the basin along the east coast and outflowing along the west coast, with some smaller-scale gyres embedded in it (1). East Adriatic Current (EAC) is considered to vary seasonally, being strongest and most wide-spread in winter, weak and narrow in summer. Moreover, there is some evidence that the current attains a maximum speed in a core which occurs up to Zadar, with the current being more uniform further north.

In winter and spring 2003 an experiment – East Adriatic Coastal Experiment (EACE) – was organized on a polygon off Dugi otok, with the aim of documenting spatial and temporal variability of EAC and understanding its dynamics. The experiment was part of a large international effort, comprising long-term recording of currents at a number of stations, several cruises in the North and Middle Adriatic, and intensive program of meteorological measurements. EACE was preceded by some preliminary modeling, which helped to organize the measurement program in a best possible way.

## The experiment

Measurements were carried out on a polygon comprising 21 stations. Currents were recorded at two stations, using barny-mounted ADCPs, between 30 November 2002 and 14 June 2003, with a 15-min sampling interval, bin size of 2 meters and contaminated layers of about 4 meters. CTD profiling was done at all stations on seven occasions between deployment and recovery of current meters. Meteorological (solar and net radiation, air temperature, humidity, precipitation, air pressure, wind speed and direction) and oceanographic (sea temperature) data were collected at nearby station Veli Rat, which was installed on 2 November 2002 and operated until 27 June 2003 with a 10-minute sampling interval. Information about the instruments used and data taken may be found at the project web site (http://www.izor.hr/eace).

Three Croatian research vessels (*Bios*, *Palagruza* and *Hidra*) were used in the experiment. The greatest challenge proved to be deployment and recovery of barny-cum-ADCPs. *R/V Bios* had to be equipped with new A-frame and winch, whereupon the operations were successfully carried out, resulting in the longest continuous current records collected up to now in Croatia. The data are still undergoing a detailed quality check, but some preliminary results are already emerging.

## Results

Basic statistical analysis of meteorological data reveals that both winter 2003 and subsequent spring were anomalous: February 2003 was exceptionally cold and dry whereas spring 2003 was considerably warmer and drier than usual. The sea responded promptly to these weather conditions. The winter cooling resulted in lower-than-average temperatures, which persisted in the intermediate and bottom layers throughout the spring season. Surface temperatures gradually became greater than long-term averages, due to intensive spring heating. Salinities were close to the averages during winter, but surpassed them – without any sign of haline stratification – during spring, reflecting anomalously dry atmospheric conditions, accompanied by weak river inflows.

Monthly mean currents measured on the EACE polygon are shown in Fig. 1. Inflow prevailed at the onshore station throughout the six-month interval, whereas currents were weaker at the offshore station and did not indicate inflow during December 2002 and January and February 2003. Obviously, the onshore station was positioned closer to the EAC core. The currents were almost uniform along the vertical.

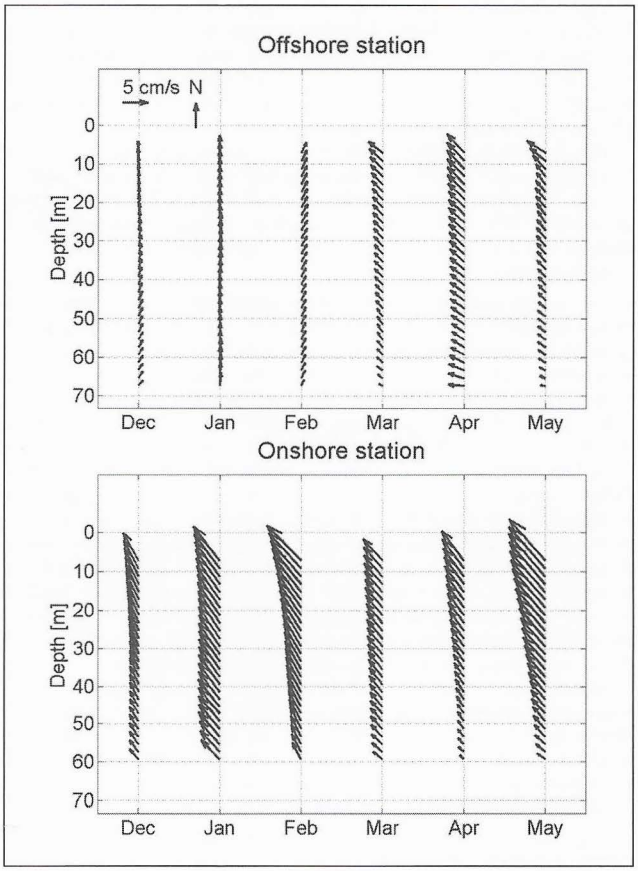


**Fig. 1. Monthly mean currents at each depth cell of the two ADCP stations, calculated over the complete months of measurement period (December 2002 – May 2003).**

Temporal variability of the currents did not follow the expected pattern, since at the onshore station the inflow was strongest in February and May 2003, whereas at the offshore station it was actually better developed in spring than in winter. Obviously, there are two possible explanations of this finding: either it is an anomaly due to atypical meteorological and hydrological conditions or the classical notions on the seasonal variability are wrong.

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## References

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