DRIFTER AND SATELLITE THERMAL OBSERVATIONS OF THE ALGERIAN CURRENT IN AUTUMN AND WINTER 1996-97

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Abstract

During autumn and winter 1996-97 surface floats observations and satellite sea surface temperature (SST) images of the Algerian Current were collected to study the evolution of mesoscale instabilities. The growth of an instability event and its evolution to a coastal anticyclonic eddy was observed between 0°-4°E. During several months the floats drifted to the east and some of them were trapped in an open sea eddy detaching from the coast.

Key-words: mesoscale phenomena, circulation experiments, remote sensing, Algerian basin

Introduction

The Algerian Current (hereafter, AC) is a component of the Modified Atlantic Water (MAW) circuit in the Mediterranean Sea. Several regional studies have been made, including observational campaigns, laboratory experiments and numerical models to explain the dynamics of instabilities of the AC, their evolution into anticyclonic eddies and their detaching from the coast [1].

The AC begins from the Almeria-Oran jet near 1°W, and then it flows along the Algerian coast [4, 5]. Between 0° and 1°E, the AC is seen to be affected by instability processes, mainly of baroclinic nature, which begin as an undulation of the stream and evolve into paired eddies (fig. 1a). Usually, the cyclonic part of the instability tends to vanish in a few days, while the anticyclonic one may persist as an eddy that strongly interacts with the main flow. This eddy propagates downstream at a few km/day with diameters ranging between 30 km and 100 km. Long time-series of satellite images account for lifetimes of several months at least [6,7,8].

Very few *in situ* data are available in the Algerian basin. Combining satellite-tracked surface drifters and series of SST maps is very useful to analyze the evolution of such eddies. The MATER/ALGERS experiment based on such a methodology was initiated in autumn 1996, in order to describe and quantify the dynamics of such events.

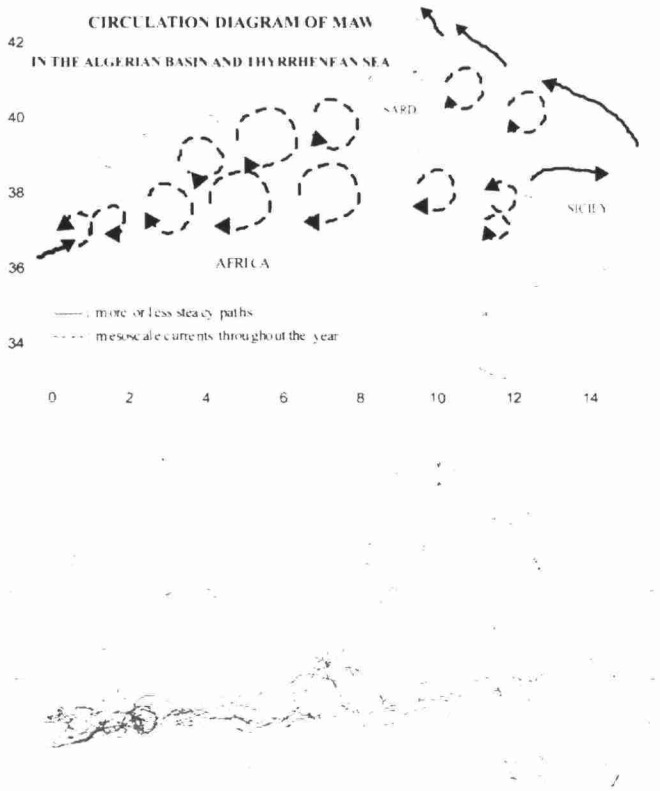

Figure 1. (a) Circulation of the water of Atlantic origin (from Millot, 1987). (b) Trajectories of the 18 drifters during their whole lifetime.

Data-set

The ALGERS'96 cruise on board the Spanish R/V *Hespérides* covered part of the Algerian coast, where a meander was observed near 1°E a few days prior to the cruise with satellite infrared imagery (fig. 2a). Near 0°, upstream of this event, on October 17, 3 surface drifters were launched 9 km apart in the core of the AC. On October 18, near 1°E, 15 drifters were launched 5 km apart across the cyclonic part of the meander (fig. 2). Each drifter was attached to a long sock (WOCE standard drogue) centered at 10m. The drifters were ARGOS-positioned 6-8 times per day, and they operated from several days to several months (fig.1b).

For the period October 1996 - January 1997, SST maps were obtained from daily composites of NOAA Advanced Very High Resolution Radiometer (AVHRR) images, using the GISIS (Graphical Interface to the Intelligent Satellite Data Information System) Internet facility

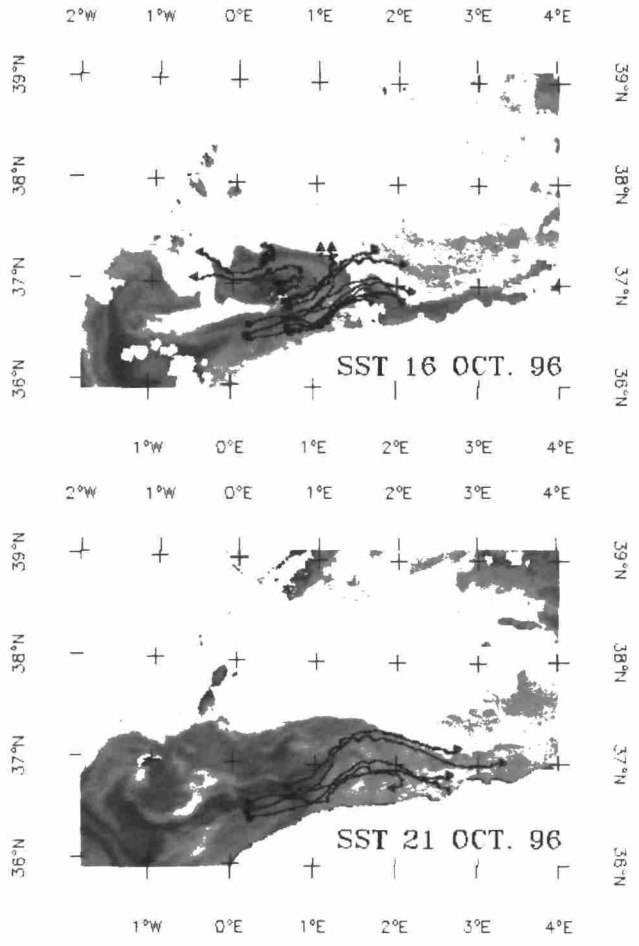

Figure 2. (a) NOAA/AVHRR SST image of October 16, showing the meander, the deployment locations of the ARGOS drifters, and their trajectories in the first five days (17-22 October 1996). (b) NOAA/AVHRR SST image of October 21 with superimposed drifter tracks during eight days, that evidenced the wave-like shape of the meander.