A PRELIMINARY ANALYSIS OF THE ALONGSLOPE CIRCULATION IN THE EASTERN MEDITERRANEAN AS INFERRED FROM INFRARED IMAGES

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Abstract

In continuation of the work in the Algerian Basin, thermal patterns of NOAA/AVHRR images have been analyzed in key-areas of the Eastern Mediterranean to clarify some surface circulation features. The mesoscale structures (filaments, meanders and eddies) observed all along coastlines from Libya to Turkey are interpreted as the manifestation of a surface circulation which, at least during the period studied (1996-2000), was mainly alongslope and markedly unstable.

Keywords: Eastern Mediterranean, circulation, mesoscale phenomena, remote sensing

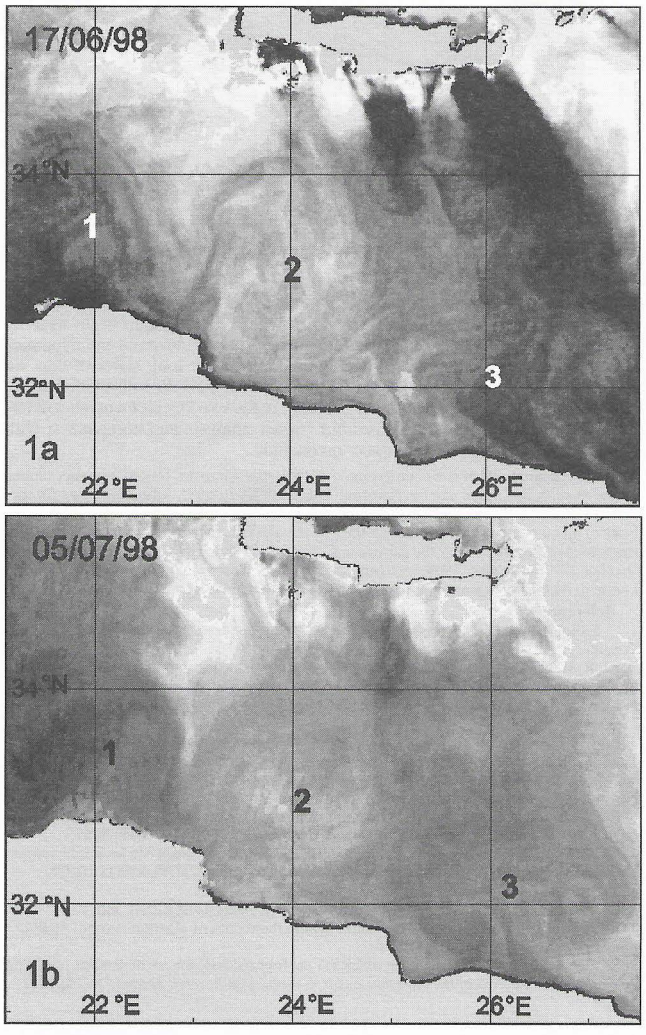
Infrared images are extremely efficient in monitoring mesoscale eddies for periods up to several years. The Eastern Mediterranean has been described as "nearly full" of eddies, but whether some of these eddies are permanent or transient features has never been fully addressed. It is all the more important since many of the eddies considered as permanent in the literature are pivotal features of the widely accepted general circulation scheme [1].

We have analyzed NOAA/AVHRR images [2] of the Ionian and Levantine basins over the period 1996-2000. Examples are illustrated in figures 1 and 2, and these analyses will be presented in detail.

Preliminary results show that (anticyclonic) eddies commonly have lifetimes exceeding 1 year (sometimes up to 3 years, as in the Algerian Basin [3]). Some can remain motionless for periods > 6 months, and/or propagate at low speed (~1-2 km/day), hence look misleadingly "permanent".

The mesoscale features show similarities with the ones observed in the western Mediterranean, where many complementary measurements have been collected. The mesoscale eddies displayed in figure 1 resemble those described in the Algerian Current, and the meanders displayed in figure 2 resemble those described in the Northern Current. We can thus infer with reasonable confidence that such mesoscale features result from the instability of an alongslope flow. The overall impression is that the surface circulation is mostly alongslope and continuous from Libya to Turkey.

Figure 1: Daily composites of the Cretan Passage. Eastward alongslope propagation of three eddies. Showed (a) on 17/06/98, (b) on 05/07/98 (propagation speed is low, so that at a 19-day interval translation is hardly visible) and (c) on 03/10/98 ("1" is not well signed).



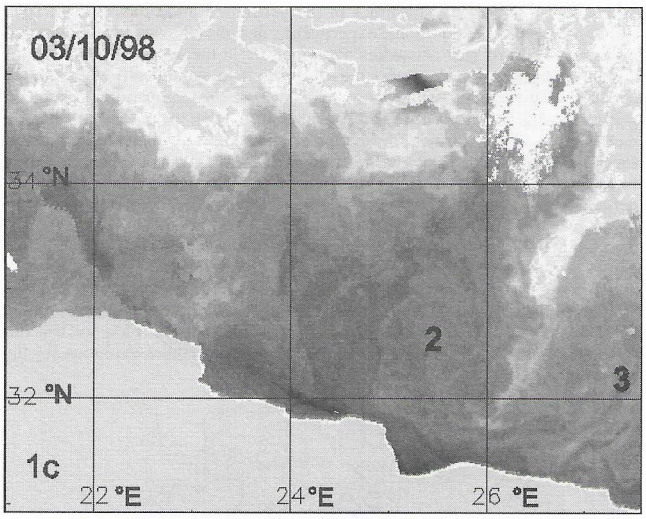
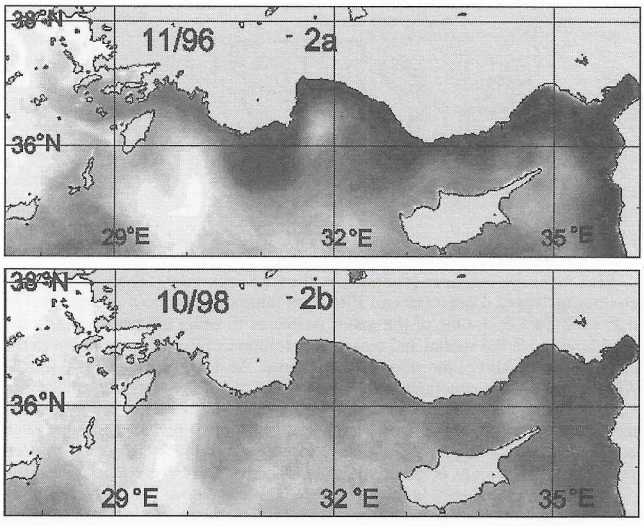


Figure 2: Monthly composites of the Northern Levantine Basin. (a): Nov.1996, (b): Oct.1998. The warmer (darker) signature of the coastal current is continuous from the Syrian to the Turkish coasts, and meanders. (Partial) continuation of this current northwestward into the Aegean Sea is visible.



References

1- Robinson, Golnaraghi, Leslie, Artegiani, Hecht, Lazzoni, Michelato, Sansone, Theocharis and Ünlüata, 1991. The eastern Mediterranean general circulation: features, structure and variability.ì21 *Dyn. Atmos. Oceans*, 15, 215-240.

2- German Aerospace center DLR: http:// isis.dfd.dlr.de. Provides daily to monthly composites.

3- Puillat, Taupier-Letage and Millot, 2000. Algerian Eddies lifetimes can near 3 years. *J. Mar. Systems*, in press.