DOES THE MID-MEDITERRANEAN JET EXIST?

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Abstract
The Atlantic water circulation in the eastern Mediterranean is still debated. Using a high horizontal resolution (∼5 km) numerical model, we found that mesoscale eddies control significantly the general circulation in the basin. Two main behaviours of the Atlantic water eastward paths in the Levantine basins are observed. One consists on a permanent alongslope current and the other one is a recurrent mid-basin current.
Keywords : Eastern Mediterranean, Ionian Sea, Levantine Basin, Mesoscale Phenomena, Circulation Models.

Introduction
In the eastern Mediterranean Sea, a large-scale cyclonic circulation [1] was widely accepted until 1980s. Then a new circulation scheme showed permanent features of cyclonic/anticyclonic gyres separated by the Mid-Mediterranean Jet (MMJ) mainly carrying the Atlantic Water (AW) [2]. At the same time, Millot [3] claimed the similarity of AW pathway in the western and the eastern Mediterranean basins. Recently, analysis of IR-AVHRR images [4] shows a cyclonic alongslope circulation dominated by recurrent mesoscale eddies and thus that denied the MMJ existence. In this study, we analyse the surface circulation from a high resolution numerical model outputs [5].

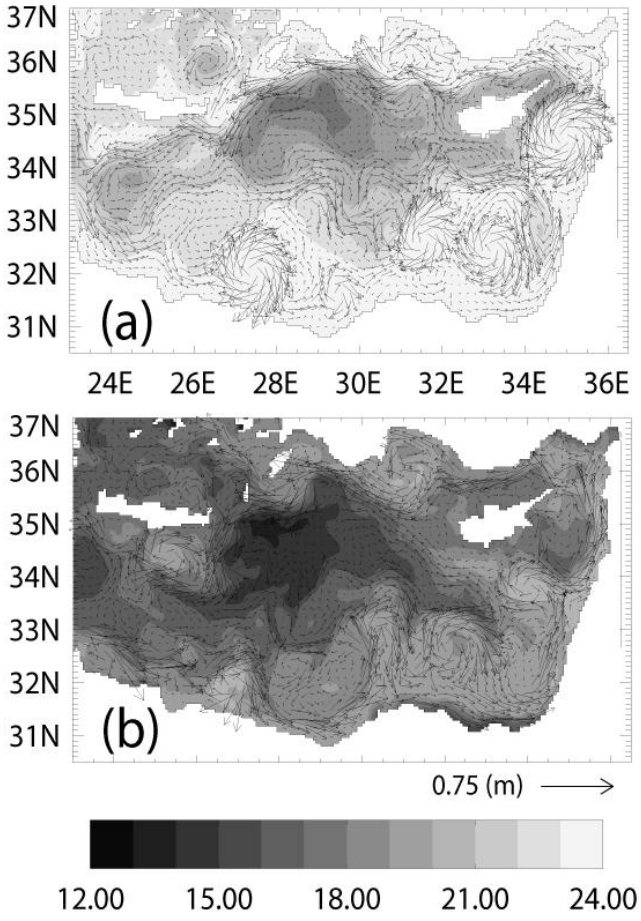

Fig. 1. Levantine Basin 2-days mean Temperature/Velocity fields integrated over the upper 50 m depth a. on October year 20 and b. on December year 21 of MED16-07 simulation.

Results
The simulated patterns suggest that the model reproduces successfully all the main general circulation characteristics in the eastern Mediterranean basin as described in the literature. Model outputs exhibit recurrent mesoscale eddies which propagate eastward except in the southern Ionian near the Libyan coasts, where they propagate westward [5]. Depending on the position and development of these eddies, different circulation regimes were observed. In the Levantine basin, the simulation shows a permanent alongslope AW current. Offshore AW advection (Fig.1a) driven by the growing of the Egyptian eddies (EEs) produces a strong jet similar to the MMJ, but it is not the continuity of the Atlantic Ionian Stream (AIS). Fig.1b shows that the Ierapetra Anticyclone generates the retroflexion of the Asia Minor Current forming a Central Levantine basin Current which also looks like MMJ, but mainly transports the Levantine Surface Water.

Conclusion
The eddy signatures are in agreement with observations of [2] and [4] that leads us to be confident in the model results. The model in all the cases reproduces a permanent alongslope cyclonic current but a recurrent MMJ. The simulated MMJ is not the continuity of the AIS and is not always associated to the AW as proposed by the POEM group [2].

Acknowledgements
This work was supported by the French MERCATOR project and HIMR (Syria). Computations were made at the French IDRIS from the CNRS.

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