

## ***Interactive comment on ““Scale oriented” embedded modeling of the North-Western Mediterranean in the frame of MFSTEP” by C. Estournel et al.***

### **Anonymous Referee #1**

Received and published: 2 April 2007

The paper entitled “Scale oriented” embedded modeling of the North-Western Mediterranean in the frame of MFSTEP, by C. Estournel, F. Auclair, M. Lux, C. Nguyen, and P. Marsaleix, describes, validates and discusses processes present in a forecasting system in the NW Mediterranean Sea, at the regional and shelf scales. The paper is interesting and informative, describing advances in operational oceanography in the Mediterranean Sea and focusing on an area of important ocean processes (deep water formation, river plume, etc.). Although the paper needs improvements, in order to become more useful for understanding the present challenges of operational activities and easier for the reader to follow, it overall addresses substantial issues and advances in the field and its conclusions are important. Thus, I propose to be published

after minor revision.

Main issues:

In my opinion, the validation must be carried out to the coastal level. Downscaling techniques and applications are crucial in operational systems, especially in areas of intense oceanic processes (such as the NW Mediterranean). The validation of a three-level system (basin-regional-coastal) could reveal important information. For the above reasons, I recommend the validation (comparison between models, satellite data and other available observations) to be performed at the coastal level as well.

The validation is basically presented in the time frame and for the whole domain, while the spatial behavior of the regional and coastal system is ignored. I think that validation and comparison on the spatial frame will contribute to the discussion of the forecasting system performance (e.g. areas close to the boundaries vs areas close to the coast).

The absence of any description of the GCM (basin scale) forecasting system makes the validation, comparison between models and processes described (in section 4) difficult for the reader to follow and understand. In the list of papers submitted in the special MFS issue, there is a paper submitted by the GCM group that should be included in the reference. Furthermore, a short description of the GCM system in the present manuscript will greatly improve the overall discussion.

The discussion of particular processes, included in section 4, is “too much” in the limited space of the present paper. In my opinion, it should be reduced to a single process (maybe deep water formation, preconditioning and the role of the Rhone river outflow). The way it is now written does not really help the reader to focus on the forecasting system performance and capability to capture the dynamics in the region. The process(es) described in section 4 should also be discussed at greater length in the introduction and section 2, in order to help understand the dynamics of the region as well as the ability of the system to reproduce them.

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Finally, the paper needs editing, especially in the abstract and introduction. The abstract should be extended and give more information on the modeling system, the period of the forecasting, the forecasting length, the overall validation and the performance related to specific processes and areas in the system. The introduction should make the reader familiar with the regional dynamics and processes involved in the discussion. Also, paragraphs 3 and 4 of the introduction need to be rewritten, since in the present form the meaning of what the authors want to state is rather vague and confusing.

Other specific issues:

In page 159, line 15, the authors state, “we can globally notice that the obtained large scale currents are rather similar”. This should be shown (not only the averaging over the forecasting day).

In page 160, line 19; explain the differences in meteorological forcing.

In section 3.2, same.

In page 162, lines 3-9, the conclusion should be better clarified taking into account that the GCM system includes SST assimilation.

In page 163, first paragraph, you should include the GCM performance and the initialization fields.

A paragraph should be included in the concluding remarks section, stating the overall performance, issues open to discussion and improvement and accumulated knowledge during the forecasting activities.

As far as the wording is concerned, I would recommend: the current “follows the coast” instead of “sticks” to the coast; “circulation features” instead of “circulations”; “perform a comparison” instead of “issue a comparison”; and also page 149, line 17, the sentence “react all the more” should be changed.

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