

## ***Interactive comment on “Surface expression of Mediterranean Water dipoles and their contribution to the shelf/slope – open ocean exchange” by N. Serra et al.***

**Anonymous Referee #1**

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As implied in the title, the paper describes Meddies, typically occurring as or interacting with dipoles, their associated currents and sea-surface signatures, and effects of the currents in total (dipole plus currents associated with upwelling) in contributing to shelf – ocean exchange.

Information comes from sub-surface float tracks with contemporary satellite remote sensing for surface temperature, chlorophyll and elevation (anomaly). Three years of a model run are also used; this is not contemporary (even if it were, one could only expect a comparison to be statistical, not deterministic).

The linkage between float tracks and surface variables by remote sensing is quite good,

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and definitely good enough to be encouraging and establish that the Mediterranean Water bodies have surface expression. Moreover, the character of Mediterranean Water bodies is represented reasonably well in the model, in a qualitative sense. Eventually one would like the model to be used quantitatively to estimate exchanges in (e.g.) Sv per 1000 km. This is not attempted here. Indeed I think this is outside the scope of the data informing the paper, in two respects. (a) The in situ and remote sensing data are not sufficient for quantitative estimates of fluxes in filaments or the dipoles to compare (statistically) with the model features. (b) I did not see a comparison between the numbers of model and observed eddies, dipoles etc. This point (b) might be discussed although I can imagine that the surface expression of Meddies etc. can be rather uncertain or obscured to confuse the comparison.

With this limitation the paper is generally interesting, well structured and straightforward to read. Point (b) above has a bearing on section 4.3; any estimate of Meddy contribution to transports depends on their numbers as well as their character. If this point is discussed I can recommend publication with only very minor amendments (mostly matters of conventional use of English).

Details. (Numbers refer to lines as numbered in the 36-A4 pages version; mostly what follows is “.. suggested re-wording ..”).

Line 29: “.. carried out prior to the clear identification ..”

Line 37: “.. pointed to ..”

Line 57: “.. consists of a ..”

Line 66: “injection of weakly stratified ..”

Line 69: “.. simplest form of response ..”

Lines 104-107: some duplication here of information first appearing around line 90

Line 124: “.. study, with two objectives: first ..”

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Lines 132-133: “.. vortices is demonstrated using .. and .. (SSH) anomalies. Section 4 ..”

Line 140: “2” and “3” should be as words “two”, “three”.

Line 143: “.. after a quick XBT survey.”

Line 208: “.. moved ..”

Line 243: “confined” not “comprised”?

Line 324: “.. lower than -10 cm.”

Lines 385-386: the second position is not north of the first.

Lines 461-472: the estimates depend on the model generating the right number of eddies (point “b” above).

Lines 546-547: “.. reconstructed. On the other hand, their clear identification with altimetry implies a barotropic character ..” [I am not sure what is the meaning of “inevitable” here].

Line 549: “in cyclones, or evidence .. features, ..”

Line 555: I don't see why a weak cyclone should show strongly at the surface. The surface elevation relates directly to surface current, not to how deep that current extends. However, a deeper current is likely to be more persistent through time, so the surface expression could last longer.

Line 562: “.. implications for the removal ..”

Figures 2, 4, 6: the captions should say (as in figures 3, 5) that the dot corresponds to the float position at the end of the period

Figure 4: values are missing from the colour scale

Figure 8: all the writing is very small, especially the Chlorophyll scale values

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Figure 13: caption should refer to Fig. 12b ?

Figure 14: the values and units (Sv.psu) on the salt flux (right-hand) axis are missing

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Interactive comment on Ocean Sci. Discuss., 6, 2579, 2009.

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