

Interactive comment on “Observability of fine-scale ocean dynamics in the Northwest Mediterranean Sea” by Rosemary Morrow et al.

Rosemary Morrow et al.

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Firstly, we wish to thank the reviewer for providing interesting and constructive comments to this paper.

Detailed response to Reviewer 1's comments :

Reviewer comment : I only strongly suggest authors to include and consider an analysis at cross-over points, as CryoSat-2 due to its non-geodetic orbit provides lot of crosses, some probably near coincident in time with the other satellites over the 13-month common data period from 1 April 2013 to 30 April 2014.

Reply : This is a very good point. There are potential crossover points during this period from Cryosat-2 on its long-repeat 369-day orbit and even from Jason-1 which moved

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into a long-repeat 406-day geodetic orbit from April 2012-1 July 2013. Our analyses of the small, fast-moving features in this paper indicated that we really need crossover measurements overlapping within 1-2 days to capture these fine-scale features. These multi-altimeter overlapping passes are also interesting for the missions on a similar inclination, since their overlapping sections can be quite long, eg Saral & Cryosat may have long overlapping sections with a time difference of less than 2 days. Similar long sections may be available from the Jason-1 geodetic mission & Jason-2. At present, we are developing the code to calculate the crossovers from multi-satellite passes and select the passes based on their time differences. This analysis is not available yet, and will not be included in the present paper, but will be continued as part of the PhD work of Alice Carret. A note on this is now included in the discussion.

Additional minor comments:

Pg 3, Row 10, “seasons,” – typo to be corrected Reply : Corrected

Pg 3, Row 25, “..The Mediterranean Sea, dominated by small dynamical structures, may have different spectral energy and spectral slopes than in other open ocean regions..” – this statement is not proved; it seems just a speculation Reply : Indeed this was not proven here. However, the arguments behind this sentence were to argue about the effects of calculating spectral slopes over a fixed “mesoscale” wavelength band over the global oceans, and the impact of this fixed wavelength band for the Mediterranean Sea where the Rossby radius is quite small. This sentence has been modified to include a clearer discussion on this key point, as follows : “These studies calculated their spectral slopes over a fixed “mesoscale” band from 70-250 km wavelength. The Mediterranean Sea, which is dominated by smaller dynamical structures, may have different spectral energy and spectral slopes in this band compared to open ocean regions.”

Pg 6, row 21, “SSH PSD” – somewhere you state SLA and now SSH. is PSD computed using SSH or SSHA (anomalies) ? Reply : We apologise for this confusion. We have

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added a sentence in the data processing section (end of section 2.1) to clarify that we use the SLA in our analyses. SSH has been replaced by SLA in the rest of the paper. “In the following analyses of spectra and geostrophic current anomalies, we will use the time-varying SLAs.”

Pg 13, row 29 and row 34, “HFradar” – separate HF from radar Pg 14, row 1, “HFradar” – separate HF from radar Reply : Done

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