

Interactive comment on “Eddy measurements, coastal turbulence and statistics in the gulf of Lions” by J. M. Redondo et al.

Anonymous Referee #3

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General comments

This paper could be an interesting contribution to the understanding of mesoscale dynamics in the NW Mediterranean. Moreover, it provides a nice review of the use and usefulness of SAR imagery to study eddy dynamics and reaches some interesting conclusions. However, I think it should not be accepted for publication in OS without major revision.

My main concern is that there is still a substantial work to do on the statistical characterization of the observations in order to better support the main discussion points. The way results are presented should be improved though additional figures and computations and more details on the methodology are needed. Finally, some structural changes could be made in order to ease the reading. English appears ok to

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me in general terms, although I have detected some confusing sentences and some typographic and punctuation errors that I detail further on.

Specific comments

As stated before, more information on the methodology used for obtaining the spatial distribution of vortices shown in figure 2 is needed. The authors cite Platonov (2004, in Spanish) for more detail on the statistical analysis performed, but some basic aspects of the data used need to be indicated here. Additional information should be provided on: Main characteristics of the images used, number of images available/analysed by area (is the coverage spatially homogeneous?), temporal distribution of the analysed images (is the study period homogeneously covered in time?), technique used for eddy detection and determination of eddy perimeters (and how ellipses are adjusted to them). . . Some discussion on how this data set is representative for the eddy population in the study area should be added.

Besides, some additional statistical aspects of the results should be also given. Time line of observations, quantitative dependence of size /orientation/ number/polarization of eddies on seasonality, distance to the coast, bathymetry or specific analysis regions should be given using a quantitative approach. Additional figures can be used, is substitution of others than can be avoided (for instance Figure 3 can be avoided by citing figures 3 or 5 in Shaeffer et al. 2011, where the same eddy from HF radar data is shown)

Shaeffer A., Molcard A., Forget, P., Fraunié, P. (2011) Generation mechanisms for mesoscale eddies in the Gulf of Lions: radar observations and modeling. *Ocean Dyn* 61 (10): 1587-1609.

It is hard to see from figure 2 that “Most of the vortices are located in a relatively nearby

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maritime band near to the continental shelf” (p59 l27-28). Moreover, authors should avoid qualitative evaluations and be more precise, for instance when determining specific ocean regions. Expressions like “a relatively nearby maritime band near to the continental shelf “ should be avoided. Similarly, it is hard to see in Figure 2 that “most of the vortices are located towards the left side of the submarine canyons” (p60 l 1-2).

Finally, concerning the structure, the paper would also improve if introduction, results and discussion were placed following a more clear order. Some titles are confusing, as, for instance, that of section 3, which does not correspond with the content of the sections (only one paragraph is devoted to ocean coastal HF radar while works based on numerical modeling and satellite thermal imagery are also introduced). (Indeed, the whole section 3 seems to be an introduction/review section rather than a results section; I recommend the authors to place it before section 2 or to develop it, adding comparison between different observing systems). Sections 5 and 6 present interesting discussion points and conclusions, but some rewriting is needed. I recommend the authors to focus the discussion and conclusion on the results and analysis presented in the previous sections.

Technical corrections

p56, l7 a point is missing between “surface” and “more”

p56, l11- Define the “test area”

p56, l15 “Coastal radar measurements confirm SAR observations” I don’t think this is shown in the paper.

p57, l24-26, I don’t think this is shown in the paper

p58, l 3-11, this sentence is too long, please rewrite.

p59 , l1 Some references are needed here

p59, l15 a comma is needed between “vortices” and “mesoscale”

p60, l12 Is it correct the reference for Schaeffer et al. 2012?, I was not able to find the

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cited paper.

p60, l13 anticyclone eddy > anticyclonic eddy

p61, l 10, please give definition for acronym "TSM"

p61, l15 a reference/references is/are needed here

p62, l8, the areas used for computation of the statistics shown in figures 5 -8 should be indicated. This could be done in the text (latitude and isobaths) or, for instance, shading the areas in Figure 2.

p62, l12-13 What do you mean with "a larger area"?

p62, l17, Do you mean Figure 8?

p63, l5, R_D already defined, you can avoid repeating the formulation here

p63, l15-16, This sentence is not clear, please rewrite

p63, l17 Estimating > To estimate

p63, l22 already defined, you can use R_D

p63,l23 Summer > summer

p63, l25 bathimetry > bathymetry

p63, l25-26 This sentence is not clear, please rewrite "Other bathimetry and forcing effects give a wide distribution of sizes"

p64, l7 and l12 radio > radius, already defined, you can use R_D

p64, l14-15 "A value of diameter of the vortices detected in cruises near the Blanes submarine canyon" What cruises? References are needed here.

p64, of (Arnau, 2000) > of Arnau (2000)

p64, l21 "So that" and "do not change much" is too colloquial

p64, l23 What do you mean by "near Barcelona"?

p65, l3 A comma is needed between "1998" and "most".

P65, l8-13, some of the statistics given repeat those on p62 l15-19, and there is not always agreement in the percent given.

P66, l2, punctuation

P69, l5 bathimetry > bathymetry

P71, l7 The reference Davies et al. 2003 is not cited in the text

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P72, I13 The reference Redondo and Cantalapiedra 1993 is not cited in the text

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