

Interactive comment on “The multifractal structure of satellite sea surface temperature maps can be used to obtain global maps of streamlines” by A. Turiel et al.

Anonymous Referee #2

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Review of ‘The multifractal structure of satellite sea surface temperature maps can be used to obtain global maps of streamlines’. by A. Turiel et al.

This paper discusses the possibility of obtaining surface velocity information from satellite derived SST maps. The proposed techniques are interesting and it is certainly worthwhile to have another means of deriving global surface velocities in addition to the geostrophic velocity that can be found using altimetry. However, the paper falls somewhat short of its potential with regards to oceanic applications. I therefore recommend acceptance of this paper contingent on some major revisions. In particular, section 4 is much too brief and should be expanded significantly. The manuscript ap-

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pears to be a bit of a 'rush' job and could profit greatly from a bit more attention.

I have read the comments of the first anonymous reviewer as well as the authors' reply and will periodically refer to both.

Specific comments:

1. In agreement with the other reviewer, I feel that the discussion of the use of singularity exponents to obtain streamlines of the underlying flow is too long, given the existence of earlier publications. No more than a summary together with the proper citations should be included.

2. The main focus of this paper is to introduce this technique to the oceanographic community and to convince its members of the usefulness of said technique. As it stands, the paper does not fully succeed, while intriguing, it is not demonstrated clearly that, in fact, streamlines are successfully reconstructed. Following this, the center piece of the paper should be section 4, which appears to have been written in a hurry.

Figs 1 and 2, while interesting can hardly be called quantitative. There obviously is a large correlation between SST obtained streamlines and those from SSH. However, there are differences between both that are not obvious to interpret. There appear to be more, smaller scale features present in the SST derived streamline field. Considering the fact that both SST and SSH data have comparable resolution, what does this mean?

The discussion of Figs 3-5 in the latter part of section 4 mostly eludes me. If the authors intend this to be their quantitative and final argument on whether their technique should be widely adopted, this section should be greatly expanded. For instance, what is the meaning of: "We show examples of divergence speeds in Figs. 5 and 6. Figures show that both advective and material divergence speeds of singularity exponents have small values, which are of the order 1-2 km/day on average." Is this number large or small? Is that good or bad? Does this support the hypothesis of the authors? Can we translate

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this somehow into an error estimate of the obtained streamlines? I can guess, but it would be better to include.

3. The authors claim that there is nothing available to check their results (and hence the inclusion of Figs 3-5). I suggest strongly (and make my recommendation for acceptance dependent on this) that the authors apply their method on simulated SST and surface currents using outputs from one of the many available ocean models. This would allow a more transparent, quantitative way to verify the validity of the proposed technique.

4. Whilst altimetry data do have certain limitations, they do provide a daily synoptic image of the surface currents of the ocean. The authors do not need to dispute this point in order to argue the use of an additional source of surface velocity information. One of the limitations of SSH information that could be alleviated by using the proposed technique, is that the tracking of SST relates to actual surface velocities rather than the geostrophic velocities that can be obtained from SSH gradients. This becomes a more important point as the resolution of the SST information becomes better. At smaller scales, where the Rossby number is larger, increasingly ageostrophic flows will be expected. This is in addition to the wind-driven Ekman currents that exist at the surface.

5. I strongly recommend that the paper be proof-read by a skilled proof-reader. Many crimes against the English language are committed in this manuscript.

Interactive comment on Ocean Sci. Discuss., 6, 129, 2009.

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