

Interactive comment on “Ocean Forecasting: From Regional to Coastal Scales” by Emil V. Stanev et al.

Anonymous Referee #2

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The paper "Ocean Forecasting: From Regional to Coastal Scales" describes various ocean modeling applications using data from the COSYNA observing system. The main purpose of the paper is "to showcase methodologies integrating observations and models in coastal areas", with a secondary objective being to present an "analysis of the synergy of coastal and larger-scale forecasting systems".

My main objection to the present ms is that it lacks structure and does not present anything really new. cursory examples are presented, with little to no supporting long-term statistics to back up the various conclusions. As a review paper it is too focused on the shallow water dynamics in one particular region and its very general title is not justified.

In my opinion, the interesting parts of the paper are the discussions about tides and

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storm surge, which is certainly important in the region of interest. I recommend that the ms in its present form is rejected and that the authors instead resubmit a more focused study on the shallow water dynamics in this region, with more emphasis on verification and less emphasis on specific examples.

Specific comments:

- The presentation is confusing and the text is not properly structured. Again, restricting focus to one specific dynamical problem would help increase the clarity of the presentation. Inconsistent use of abbreviations adds to the confusion (e.g. "SAR" vs "search and rescue").
- Central information about the various modeling systems is only given in the appendix. The level of detail is unsatisfactory and the ms cannot stand on its own in its present form. A proper model comparison will require a more elaborate discussion about their differences, for instance the impact of using hourly vs six hourly atmospheric forcing. It is also difficult to keep track of which model is used for what purpose as the authors jump back and forth between them in the examples.
- Errors of representativeness, which becomes an important issue when downscaling data assimilative models merits a discussion, but is not mentioned here.
- References are missing in several places, e.g. pages/lines 2/15, 3/24, 7/12; there are several errors in the citations (e.g. 5/24, 10/28); and reference to unpublished material makes no sense (9/4).
- The HF radar assimilation technique based on the method of Stanev et al (2015) may be well justified for use in this region, but might be less useful in regions where baroclinicity and/or the influence of complex topography dominates. It would be good to see an assessment of the impact of HF radar DA on storm surge predictions instead of the (very short) discussion about search-and-rescue support. Several published papers deal with the impact of HF radar data assimilation on current predictions, e.g.

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Barth et al (2008, JGR, using ADCP for verification), Yaremchuck et al (2016, DSR II, using drifters), Sperrevik et al (2015, OS, using both drifters and ADCP), so that the cursory example presented here does not really provide anything new.

- The apparently small impact of in-situ data (ferrybox) vs the OSTIA product indicates that the DA system is not working optimally. I would expect in-situ data to be rather more valuable, but again, very little in the way of statistics is presented, e.g. innovations vs analysis increments and their temporal and spatial distributions. Mention could also be made about rapid update cycles, which is used successfully by e.g. the KNMI in their regional NWP system to maximise the use of observations in small model domains (deHaan, 2013, QJRMS).

- The "two-way nesting" method described in Sec. 2.3 differs from the full online nesting implemented in e.g. ROMS and AGRIF. I assume the nudging based method presented here will in practice work as a low pass filter when information is exchanged between parent and child grids, and I would like to see what the impact is on fast time scales such as tidal wave propagation.

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