

Interactive comment on “Development of Black Sea nowcasting and forecasting system” by G. K. Korotaev et al.

Anonymous Referee #2

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This work is to develop a Black Sea hydro-ecological community nowcasting/forecasting system and to apply this system for the operational use in the framework of the Black Sea GOOS initiative. The manuscript describes: a history of the development of the nowcasting/forecasting system during last decade which has been done at the Marine Hydrophysical Institute (MHI), Sevastopol, Ukraine (Introduction); a general structure of the marine circulation part of the system and data assimilation approach (Paragraphs 2); qualitative and quantitative circulation model calibration (Paragraphs 3); then, briefly, a biochemical part of the system (Paragraph 4) and its calibration results (Paragraphs 5); and general architecture of the operational nowcasting/forecasting system (Paragraph 6).

As such, this study is a logical extension of previous published works by the same

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group, presenting status and results of the last version of the Black Sea nowcasting/forecasting system.

The improved algorithm of the system has yielded interesting and important results, worthy of publication.

However, there are a number of features the paper needs to bring out better, listed below, as well as a few minor amendments required.

General points.

1. This part of the manuscript is used to briefly describe two numerical models: MHI z-coordinate model and sigma-coordinate POM. I would give some comments what kind of model formulation has advantage/disadvantage to describe general and local structures of the Black Sea circulation as well as their coastal and mesoscale circulations, eddies, etc.
2. I suggest to cite some additional publications concerning sea/ocean modeling, physics, numerics, data assimilation techniques, etc. It would be nice to briefly clarify what is new in the MHI model, what is done by the Black Sea community (see p.919, lines 12-17) and some others teams.
3. I would structured section 7 Conclusions to have a more clear understanding what has been done during development of the Black Sea nowcasting/forecasting system from the physical, biochemical, data assimilation, etc. points of view.

Specific points.

1. P. 920, line 20. I would remove “so-called” - primitive equation system it is commonly used definition.

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2. P. 921, line 1. "terrain following sigma coordinate in the vertical" – needs to be corrected.
3. P. 921, lines 13-15. "The hydrostatic eq. ... allows a more ..." – to clarify this sentence or to get a reference.
4. P. 921, lines 19, 21 – to choose "leapfrog" or "leap-frog" scheme?
5. P. 921, lines 21-23. "Vertical coeff. .. were parameterized by Philander-Pakanovsky formula as suggested by Friedrich and Stanev" - needs to be corrected.
6. P. 921, line 24. "5, 10⁷" - there should be 5x10⁷.
7. P. 921 "Therefore the results..." – I did not understand how the results from POM were used for improving the upper layer dynamics in the MHI model?
8. P. 923, line 1. In (1) I would not use letter S.
9. P. 925, line 6 – "to prevent ... sliding of the model to its own climate" – seems to be corrected.
10. P. 925, line 16. "... simulates the Other ... features.." ?
11. P. 927, line 13. "Thus ... fields are in good qualitative agreement with observations" – to give corresponding references.
12. P. 927, lines 23-24 – data of 1992-1995 and reference (Oguz et al., 1993) needs to be conformed.
13. P. 927, line 24. "... run without assimilation of SST" – I would recommend to note that this run was done with SSH and salinity assimilation.
14. P. 932, lines 7-8. "Space resolution for both parts of the ecosystem model ... is app. 5 km" – compare, please, with p. 921, line 26 and correct.
15. P. 932, lines 15-16 - what is written seems to be correct, but I don't see comparison with observed data at fig. 14.

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16. P. 932, line 22 – "Numerical simulation With 5 km grid step" – seems to be conformed to the pages 921, 926. By the way, I would suggest somewhere in *this section 5 to repeat which model output was used to run ecosystem model - NHI or POM.*
17. P. 935, line 25 – Starnev should be Stanev, see p. 921, line 23.
18. P. 949, fig. 12 – It should be pointed out that there are zonal (left panel?) and meridional (right panel?) surface velocities (or currents?) (see p. 930, line 16).
19. P. 951, fig. 14 – if the vertical axe is minus depth (in m) to say why or to remove minus and note that it is averaged quantities over a horizontal plane.

Interactive comment on Ocean Sci. Discuss., 8, 917, 2011.

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