

Interactive comment on “The Sicily Channel Regional Model forecasting system: initial boundary conditions sensitivity and case study evaluation” by S. Gaberšek et al.

Anonymous Referee #3

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The goal of this paper is to assess the ability of the SCRM to simulate the complex Sicily channel circulation by experimental validation. The validation of a numerical model is a crucial step, and the use of a complete data set, including in-situ TS profiles, remotely sensed SST and current measurements obtained by 2 chains sea-current meters is significant and appreciable.

I would recommend the publication of this paper after minor revisions.

Specific Comments:

p.223 l.21 The discussion on the "warm/cold start" is very confusing. Aren't the authors

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talking about the one-way nesting procedure/embedded models? "if the ocean model has a lower resolution..." which ocean model are the authors talking about? lower resolution than what?

"In this case a high resolution model [] is required..". I think that the problem is not well posed. You have a high resolution model that needs to be initialized, and having only the "coarse" resolution OCGM available for initialization/bc, you need a spin-up phase to adjust from the large to the small scale processes which can be resolved with the SCRM.

p.224/225 Add the following references : Molcard et al., 2000, Numerical investigation of hte Sicily Channel dynamics: density currents and water mass advection, J. Mar. Syst., 36, 219-238 Pierini and Rubino, 2001, Modeling the oceanic circulation in the area of the Strait of Sicily: the remotely-forced dynamics, J. Phys. Oceanogr., 31(6), 1397-1412.

p.226 l.13: Please make clear the slave mode technique. "Re-initialized for each forecast", which forecast? the authors are talking about 5-day forecast...Maybe a schematic diagram would clarify the nesting method, and the forecast timing.

p.226.l.19 I think that an introduction to the VIFOP analysis is necessary.

"VIFOP is a variational balanced initialization technique able to analyze the observations or the outputs of regional scale or basin scale circulation models used as initial field or open boundary forcing of high resolution ocean models. Such method reduces drastically the amplitude of numerical transient processes following the initialization by reducing the misfit of the initial field. The method is based on the minimization of a cost function involving data constraints as well as a dynamical penalty involving the tangent linear model."

The authors should also give a short explanation about the "optimization of the global divergence, of the surface elevation tendency".

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p.228 First paragraph. This sentence should be somewhere else in the text, maybe in the conclusion (p235, l.22).

p 230, l.10 In the figure I can see 3 major peaks, could the authors explain all of them?

p 230, l.16 I cannot see the "approximate period of 9h"

p 230, l.20-22 I think this is a crucial point in the use of the VIFOP technique. How do you separate the physical from the numerical instabilities(p.226,l.23-24)? How can you be "aware of the side effects of using VIFOP"?

Fig.6-7 captions. "Measured in-situand interpolated model output obtained from Med-Argo glides and VOS_XBT". The model output is it really obtained from the gliders?

p231, l20. "A geographical position in the strait". THIS sentence doesn't have any sense, and can certainly not be "the possible reason for the discrepancy".

p.232 l9 The mixed surface layer is the most critical in the modeling procedure. Usually the direct comparison with sea surface data is very difficult because the model is not able to correctly reproduce the high surface variability. How do you extrapolate?

p.234 I'm not surprised by the fact that the direct velocity comparison at one geographical position Salinity comparisons. Water mass characteristics are usually captured by numerical models, while a point-to-point velocity comparison is a very difficult task. However the model should be able to reproduce at least the transport across the 2 sills in the channel, where C1 and C2 are located. The model is not giving satisfactory results as the Temperature

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