Response to the Topical Editor review

Dear Editor,

Thank you very much for your revisions which have been adressed in the sections below.

1- Why did you change “part” for “dataset” in the manuscript title? I think it is inappropriate as “dataset” can also refer to observations. I propose to change “dataset” for “analysis” or “results”.

Response: The change was done during typesetting for the previous article dealing with the evaluation of the atmospheric part: https://gmd.copernicus.org/articles/14/3995/2021/
As the authors are not native english speakers they believe it is better to follow recommandations from typesetting experts. Consequently, to be homogeneous, the authors also changed the title of this article. Nevertheless, the title has been changed to "ocean results".

2- Regarding your reply to reviewer #1 main comment on “Coupling”, I consider that it is relevant. However, I think that still more emphasis should be put on this aspect of one-way coupling:
- “one-way” should appear in the manuscript title : “ Performance of the Adriatic Sea and Coast (AdriSC) climate component – a COAWST V3.3-based one-way coupled atmosphere-ocean modelling suite ...”

Response: "one-way" was added to the title.

- In section 4, the fact that your system is only one-way coupled should be repeated. e.g. by changing the 2nd sentence for “The main … of a kilometre-scale one-way coupled atmosphere-ocean model for long-term ...”

Response: "one-way" has been added to the 2nd sentence.

- In the paragraph starting at line 160, I think that you should emphasise that the boundary forcings you describe are needed because your system is not coupled in the ocean-to-atmosphere direction.

Response: Actually, paragraph originally starting at line 160 describes the boundary and initial conditions use to run the ROMS 3-km ocean model ... Consequently it is not related to the "one-way coupling" with the atmosphere. However, the authors added the following sentence after the description of the MEDSEA re-analysis in order to remind the reader that SST used in WRF is also coming from MEDSEA:
"It should be noted that the SST used in the WRF models is also provided by the MEDSEA re-analysis as fully described in Denamiel et al. (2021b)."

- In this paragraph, you should also describe in more detail how do you derive the future SST forcing for WRF; currently, the only thing you write about this is half of a sentence at lines 139-

140 and I consider this is not emphasized enough.

Response: The description of the PGW methodology developed by the authors for the ocean models is fully presented in their previous work: Denamiel et al. (2020a) and is not the objective of this evaluation study which only deals with the historical period not the projected climate changes. The authors thus propose to modify the paragraph starting at Line 136 as follow:
"... As a consequence, within the AdriSC modelling suite, the WRF models do not benefit from the more accurate simulation of the SST done with the ROMS models. This is also true for future scenario runs which only add climatological changes (e.g. increase of SST up to 3.5 °C in summer) to the SST forcing used in the evaluation run following the Pseudo-Global Warming (PGW) method originally developed for the atmosphere (Schär et al., 1996) and extended to the ocean by Denamiel et al. (2020a)."

- Also in your conclusion, you should at least briefly discuss the limits of this aspect of one-way coupling and what benefit would be added with 2-way coupling. Reviewer #1 seems to ask for that type of discussion (see his/her last sentence in his/her comment “Coupling”).

Response: The authors agree that the benefice of two-way coupling should be discussed. However, it is related to the atmospheric models and not to the ocean models which are the focus of this article. Consequently the authors added this sentence at Line 136 where the two-way coupling is already discussed:

"Ideally, a two-way coupling which imposes the SST of the ocean models to the atmospheric models should be used in climate studies. Indeed, it allows for better representation of the SST which is known to impact the local and regional precipitations (Mejia et al., 2018; Yang et al., 2019; Johnson et al., 2020). In the AdriSC modelling suite the two-way coupling would require the use of an additional ROMS 9-km grid covering the WRF 15-km domain. However, due to limited numerical resources and the slowness of the AdriSC modelling suite, such a set-up could not be envisioned in this study. "

3- To answer reviewer #1 comment on the ocean model, you reply that you added a whole paragraph on the initialisation and the spin-up “Fourth, the AdriSC evaluation … carried out with the AdriSC climate model.” but I cannot find it in the revised version of the manuscript. Please add it!

Response: The authors apologize for not including the paragraph and have added it in the new version.

4- I understand that the 1-km ROMS is nested in the 3-km ROMS. This is clearly stated only once, at line 126. Can you repeat this at places in the text? Can you be more precise on how the one-way nesting works? What fields are transferred from the 3-km to the 1-km ? Table 1 should give more detail on that.
In general, I think you should avoid refering to 2 models but instead refer to one ROMS model

with a 1-km region nested in a larger 3-km region.

Response: "the one-way nested (AdriSC) ROMS 1-km" as been added at Lines 156, 218, 273, 280, 587, 683. To clarify the one-way nesting between ROMS 3-km and ROMS 1-km grid the following text has been added " ... with a one-way nested 1-km grid (676 x 730) receiving temperature, salinity, ocean currents and sea-surface elevation at its boundaries from the AdriSC ROMS 3-km model." Table 1 has been modify to include the fields exchanged in the one-way nesting.
The authors would like to keep the denomination "model" as the two grids receive different forcing at their boundaries and are not two-way coupled. In other words, the ROMS 3-km model downscale the MEDSEA re-analysis while the ROMS 1-km model downscale the ROMS 3-km model results.

5- l.567: I think it is improper to write that MEDSEA fields are used to force the initial and boundary conditions; MEDSEA fields are used AS initial and boundary conditions; can you correct the sentence?

Response: The sentence has been corrected.