

## ***Interactive comment on “A coupled wave-3D hydrodynamics model of the Taranto Sea (Italy): a multiple-nesting approach” by M. G. Gaeta et al.***

**Anonymous Referee #2**

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The manuscript describes a set of numerical applications finalized to reproduce the main hydrodynamics in a coastal area of the Mediterranean Sea, the Gulf of Taranto. Multiple nesting techniques and different numerical tools are applied to provide operational predictions of waves, currents and water levels for an area characterized by a high risk of pollution impacts. The paper falls within the scope of the journal. The arguments treated are very interesting and promising, nevertheless a major revision of the manuscript is required before being published.

Main concerns refer to the overall manuscript structure and to the quantification of the model accuracy. As a first, I suggest to separate the methodological sections from the results sections. In the present version the sections 3.1 and 4.1 describing the different models setups are included into that part of the paper should be dedicated to the description and discussion of the model results.

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The Section 2.1 could be split into Model Description (2.1) and Model setup or Nesting Procedure or similar (2.2) including all the informations (including the Sections 4.1 and 4.3) needed to understand the different numerical experiments you performed. The Section 2.2 should describe only the field data, a specific Site Description Section could be included after the Introduction and before the methods.

Regarding the content of the methodological sections, you have to strongly reduce and try to clarify them. In particular, it is not necessary to describe the modifications you carried out to the model codes e.g. page 5 “ In order to implement the proposed multiple-nesting approach, the authors properly modified each of the aforementioned modules in order for them to be able to read: (i) space-varying initial conditions for 2D/3D currents and water elevations (in TEL2D/TEL3D) and 3D environmental fields (in TEL3D, i.e. temperature and salinity); and (ii) time-/space- varying boundary conditions of wave spectra (in TOM), 2D/3D currents and water elevations (in TEL2D/TEL3D), and 3D 5 environmental fields (in TEL3D) and (iii) time-space varying surface conditions for wind (both in TOM and TEL2D/TEL3D) and meteo-climatic conditions (in TEL3D, i.e. atmospheric pressure, air humidity, cloud cover, etc.). “ This can be deleted it is not relevant to the scope of a research paper. “

Again, it is not necessary the author mentions and describes the “fractional steps method” page 8 as well as cites the names of any Fortran files or similar.

The equation 1 is pretty alone in this context. Its presence is not necessary to deepen the results discussions. I think you can just refer to TEL3D documentation or previous works without described it. But if you prefer to include it you should also describe the whole equation system. In this case, I suggest to include them into an Appendix.

The table 1 is not clarifying too much the different nesting procedures. I suggest to enrich this table with the proper informations to clarify the different approaches.

Regarding the results, you have a lot of potential occasion for deepening the discussion which are missed. As a first, you should merge them into a unique Section (Model

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Results) at least divided into 2 sub/sections. Then you have to improve them. For each different model accuracy analysis I suggest to quantitatively describe both the real measurements, by providing some statistics about the data (e.g. extremes and averages), and the differences with the model results, at least through RMSE computation or similar. The present version include, in most of cases, a qualitative description of the figures without any quantitative information.

I think the paper can be valorised also by a revision of the English language and grammar.

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