Response to reviewer Jun She

We would like to thank the reviewer for his helpful comments. The corrections and suggestions made all serve to improve the paper, for which we are grateful.

Responses to the detailed comments are given below.

<u>Response to comments</u>

P2618: L18, "licensing" to be more specific, is this "licensing for marine operations"?

It is, text has been updated to be more precise.

P2619: L8, "More recently" can be more specific, e.g., "Since19xxs"

The onset of the 3D work in the 1990'is added

 P2620: L23-24, WWIII has a two-way nesting facility, is this used in the nested setup?

It is not. Text has been added to explicitly clarify this.

P2621: L8-L13, regarding to the strength of using SMC grid, it would be good to mention the scientific performance of the SMC grid and nested grid: does SMC grid improve the forecast than the nested grid? And how computationally efficient the SMC grid is?

A paragraph has been added discussing the quality of the SMC grid products, and the relative computational costs

L26-27, it can be helpful to mention what type of tide-surge models is currently used, is it a 2D ore 3D model? P2622: L4: a reference on CS3X could be useful

 A few more details of the model are included in the text, including specifying it is a 2D model and a reference to the original modelling work.

L20: "Data assimilation" in OSTIA: normally the word "data assimilation" is used when the data is assimilated into a dynamic model. In case of OSTIA, I guess it is a statistic model that combines different types of SSTs through optimal interpolation.

New text has been added that clarifies that the data assimilation method is being used to combine the observations and a background field and, for OSTIA, the background field is an SST forecast produced by persisting anomalies from the previous day's analysis (with some relaxation to climatology).

L23: "each SST" should be "SST at each grid".

The sentence is improved to: "An uncertainty estimate is provided, giving each SST value an associated uncertainty."

P2623: L6, do you mean "reanalysis" or "reprocessed time series"? When one use reanalysis, it normally means that a dynamic model is used with assimilation.

We meant reprocessed not reanalysised . This has been corrected in the text.

L17, "GMPE" – full name is needed

GMPE has already been written in full P2623, L2.

P2624: L28, "a implementations" should be "implementations".

Corrected

P2627: L21-22, HF radar has been widely used in surface currents but not sea level measurements. If the statement is true, please give a reference.

The sentence is wrong, and has been updated to refer to currents not sea level (as it was intended to). There is also potential for sea level, but this is both less mature and not likely to be as significant given the coastal tide gauge network.

P2628: L18, "skill" vs "a high skill"?

Agree, this is imprecise. Given high skill is not necessarily achievable for all systems we have substituted "sufficient skill" to reflect that low skill may still be usable skill .

P2629: L4, "latency in the ocean system" can be more precise as "latency in the ocean forecasting system"; regarding to the reason why atmosphere-ocean coupled system has not been developed for improve NWP, meteorologists have different explanation: in the time scale of the synoptic events in mid- and high- latitude, the events are mainly driven by Available Potential Energy in the atmosphere, hence the impacts from the ocean are negligible.

The sentence on latency has been removed in response to another reviewers comments.

 L15-16, not easy to understand, either give an example or express the idea more explicitly

The paragraph has been reformulated to be more explicit and more easily understood.

L21, "most significant" vs "most significant issues"?

Changed as suggested.

 L23, "the impact errors" vs "errors related to the impact"?

Corrected by inserting 'of': "the impact of errors"

 L24, "errors" vs "the errors"

The authors are unsure which error in the use of the word error this refers to. P2629: L24 does not include the word error.

P2630: L3, "below" vs "through"

Either term seems appropriate; we have changed the text to use the term "through".

L7, "tracability" vs "traceability" ?

Corrected

P2631: L3, "mature" vs "mature."

Corrected

L23, "Shelf seas environments" vs "Shelf sea environments"

Corrected

P2632: L7, "Shelf seas environments" vs "Shelf sea environments"

Corrected

L15-16, "formulations derived in regimes far removed from those being modelled" – difficult to understand, to be rewritten.

It has been rewritten to improve clarity.

P2633: L13-14, "missing key processes" vs "missing some key processes".

Corrected

P2635, L4, "may well be improved" vs "may well be improved through the coupling"?

The wording has been updated to make it clear this sentence refers to improvements to wave/ocean models from using high resolution atmosphere forcing.

L23, "Bidlot, 2009)," vs "Bidlot, 2009)."

Corrected

L25, "a users preference" vs "a user's preference"

Corrected

P2636, L6-7, "applying wind stress to the surge model via the waves", can this be explained more explicitly?

An explanation has been included in the text ... the use of wind forcing direct to ocean/surge models without including a time evolving the wave field leads to a misrepresentation of the wind effects.

P2637, some acronyms mentioned without giving the full name, e.g., WWRP, SMRCP-TT, WGNE.

Acronyms spelled out in full.

P2642, L6, "provide useful information" vs "provide useful estimation" (which is more precise)

Suggestion has been included in the text