

Interactive comment on “A methodology for estimating the response of the coastal ocean to meteorological forcing: A case study in the Bohai Bay” by Daosheng Wang et al.

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The paper presents a multivariable linear regression method (IBR) to estimate the effect of atmospheric conditions on the sea level variations. The skill of the method is demonstrated for two selected stations in the Bohai Sea in northeastern China. Unfortunately, I cannot recommend publishing this manuscript in Ocean Science, because both the method and also the obtained results are not acceptable.

The method is far from being new or innovative. It is a standard multivariable regression method, just using regional low-pass filtered input data. However, it remains totally unclear, how these results depend on the actual size of the selected area to determine

the regional values. If one increases the size of the regional window, more far-field effects would be accounted for. Probably there is a strong dependency of the method on the specific conditions in the area of interest, but perhaps also on other factors, e.g., the season of the year. This brings me to the other major criticism regarding the method. As it is designed now, it is very site-specific. It is not even clear, whether for other regions the standard multilinear regression method could provide better results. Any discussion regarding this issue is missing.

In addition, the obtained results do not justify a publication. The only “real” results related to the underlying physical processes in the Bohai Sea is the conclusion that the regional forcing has a stronger impact on the sea level than the local forcing. As already stated above, this strongly reflects the specific conditions in the Bohai Sea. Furthermore, even for two different stations in the Bohai Sea, the dominance of the regional forcing is quite different as shown in the paper. A simple two-dimensional numerical storm surge model could provide the dynamically correct response of the atmospheric forcing on the sea level variations for the entire Bohai Sea, which would allow a much more sound analysis of the underlying physical processes. For the 2D case, the mentioned limitations due to the too coarse horizontal resolution of the topography should be no problem. When forced with adequate open boundary conditions from a larger open ocean storm surge model, also external surges could be resolved, which is a major culprit of the IBR method presented here. However, as can be seen from figs. 7 and 8, such realistic open boundary conditions were not employed for the model study carried out in this paper. Therefore, the comparison of the model skill with the skill of the IBR method is extremely questionable.

I have several other criticisms regarding minor issues. However, at the present stage, it would make no sense to list them all. Last but least, I want to mention that altogether six authors from four different institutions sign responsible for this paper. Considering this, a more sound scientific work would be expected.

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