

Interactive comment on “Testing the validity of regional detail in global analyses of Sea surface temperature – the case of Chinese coastal waters”

by Yan Li et al.

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Received and published: 29 March 2019

Dear Prof.Wu:

Thank you very much for the helpful comments on our manuscript “Testing the validity of regional detail in global analyses of Sea surface temperature - the case of Chinese coastal waters” (No: os-2018-137). For the revision, we fully considered all suggestions and give the item-by-item reply. Also, we tried our best to improve the English writing in our manuscript. And revised portion are highlighted in yellow in the manuscript. We appreciate for the your work and hope that the correction will meet with approval. Once again, thanks very much for your comments and suggestions.

Best regards

Yan Li, Hans von Storch, and coauthors

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1. Please further explain the reasons for determining these 26 special coastal stations and what characteristics they have. For example, why important cities such as shanghai and other Yangtze River Deltas are excluded. Scholars may be very interested in the changing laws of these coastal stations. Is it possible to supplement them?

Reply: Thank you for pointing it out. And we have added this explanation in the revised paper. Currently, more than 100 hydrological stations are operating and monitoring near-shore hydrological conditions. Among these stations, only 26 stations have routinely and continuously recorded since 1960, with a percentage of missing data lower than 4%. Also, these stations have undergone only a few (five and less) and documented relocations. Among the 26 stations, there are only few along the southern Yellow Sea Sea, because this area is a vast muddy coast which is not suitable for hydrological stations. Unfortunately, the limited data sets for this region do not satisfy our needs of temporal coverage and completeness of records: Since 2000s, there have been some automatic stations. Around the city of Shanghai, there are 7 hydrological stations (Figure 1). Among them, only the Tanhu station has at least 50 yr of continuous observations of SST in the period from 1950 to 2015 (66 years) (Table 1). However, percentage of missing data of SST series in Tanhu station is higher than 4%. Therefore, our data set has no entries for the Shanghai/Yangtze River Deltas area.

Figure 1. 7 hydrological stations around Shanghai

2. When the same method is applied to a variety of different dataset, what is the difference, whether there is a need for major factors, especially for data sources with different lengths of time series. I think it should be pointed out.

Reply: In this study, the same method was applied to a variety of different datasets. We found that all of these globally gridded datasets exhibit broadly the same pattern in

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space and time as the EOFs of the local homogenized (LH) SST data from 26 coastal sites. However, all of these globally gridded datasets exhibit surface temperatures usually higher than the LH data. This difference may be caused by two factors. First, there are several the coastal upwelling currents at the East China Sea and the northern South China Sea, leading to cooler water temperature than nearby. The cool SST hardly can be described in the globally gridded datasets due to their coarse spatial resolution. Second, we suggest that this is related to the coastal position of LH, and the averaging in the LA data. The differences are largest in the case of the coarsest analysis (ERSST), but weakest in the OISST-data set with a resolution of a quarter of a resolution degree.

3. The authors used the HadISST1, ERSST, COBE SST, and NOAA OISST dataset to calculate the long-term trend of SST in the marginal seas, e.g., coastal water of China. It is well known that the SST observations are extremely sparse during the early decades until satellite measurements being available in the 1970s, especially within the marginal seas. Therefore, I think a long-term SST trend using such a dataset is hard to convince. The authors need to explain this in more detail.

Reply: We agree with you, and this is one of our main results, namely that the homogenized local data (LH) are partly inconsistent with the variability and trends in the global analyses (LA). We are not showing the trends in the LA-SST because of a wish to documents the real trends, but to assert if the LS-SST trends (and variability) are consistent with the LH trends and variability. The result is that there are inconsistencies. This is explained in the manuscript.

Please also note the supplement to this comment:

<https://www.ocean-sci-discuss.net/os-2018-137/os-2018-137-AC2-supplement.pdf>

Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2018-137>, 2018.

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