

***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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Review of Yan et al. “Testing the validity of regional detail in global analyses of sea surface temperature – the case of Chinese coastal waters” submitted to the Ocean Science (OS-2018-137)

This is an important paper and it should be accepted and published pending a moderate revision. The manuscript (MS) is written clearly. The data analysis and discussion are succinct and concise. There are a few major concerns and several minor comments/edits.

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Major comments:

This MS presents results that appear striking. Systematic differences between locally measured annual mean SST (termed “locally homogenized” or LH SST) and gridded analyses (LA) amount to 4°C (!) as illustrated by the remarkable Fig. 7 that shows SST differences (at 26 coastal locations) between LH and LA-OISST, LH and LA-ERSST, LH and LA-COBE SST, and LH and LA-HadISST. All four gridded analyses (LA) are warmer than LH at all (26) but one coastal station. The differences between local SST and gridded SST (denoted here LH and LA for brevity) peak off the SE China, along the Taiwan Strait coast, between Putian in the north, Xiamen in the middle, and Dongshan Island in the south.

Alas, the authors, while documenting their results quite extensively, have not invested enough efforts in analyzing and explaining such striking results. Moreover, they seem to downplay the obvious importance of their own results. Otherwise, it is hard to explain why these major discrepancies are not mentioned in the abstract and only briefly mentioned in the end of Section 5 (“Discussion and conclusions”).

The authors are probably correct when they state (line 302) that these differences are “related to the coastal position of LH, and the averaging in the LA.” Yet they do not offer any physical mechanism that would explain such large differences between coastal and offshore SST. The most important and plausible mechanisms are (1) winter cooling (exceeding 2°C along the Zhejiang-Fujian coast) on the inshore side of the Zhejiang-Fujian front (Hickox et al., 2000) and (2) southward transport of cold water by the China Coastal Current (CCC). As pointed out by Belkin and Lee (2014, p. 830), “The crucial role of CCC in regulating the hydrography of the Taiwan Strait was amply demonstrated by the 2008 cold disaster caused by southward invasion of the CCC waters, when SST dropped by almost 8 °C vs. a 12-year mean February SST.” Hopefully, the authors will address these mechanisms in a follow-up paper that should focus on seasonal variability of the above-mentioned discrepancies between LH and LA.

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Minor comments:

(1) I have highlighted quite a few passages in the text that should be re-worded. The authors are able to improve the text themselves. Therefore, I have not suggested any specific edits. The annotated manuscript is uploaded. (2) In Fig.1, stations should be shown with consecutive numbers (as in Table 2), not acronyms. (3) Coordinates (lat, lon) of all 26 stations should be documented in the paper. (4) Perhaps, the text would be easier to read should the authors cite full names of 26 stations (complete with their numbers) vs. 26 acronyms. I would argue that full names are easier to memorize than respective acronyms, especially when the full names are accompanied by respective numbers. For example, it is easy to remember that there is a large spatial gap between Station 10 (LYG) and 11 (SPU) (Fig. 1 and Table 2).

Conclusion: I recommend acceptance pending moderate revision focused on adding a thorough discussion of physical mechanisms responsible for discrepancies between LH and LA.

References:

Belkin, I.M., Lee, M.-A. (2014) Long-term variability of sea surface temperature in Taiwan Strait. *Climatic Change*, Volume 124, Issue 4, Pages 821-834.

Hickox, R., Belkin, I.M., Cornillon, P., Shan, Z. (2000) Climatology and seasonal variability of ocean fronts in the East China, Yellow and Bohai seas from satellite SST data. *Geophysical Research Letters*, Volume 27, Issue 18, Pages 2945-2948.

Best regards, Igor Belkin

Please also note the supplement to this comment:

<https://www.ocean-sci-discuss.net/os-2018-137/os-2018-137-RC3-supplement.pdf>

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

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