Review ESSD-2019-80, CMST

The authors merged C-LAST1.3 (land surface temperatures) with two well-known ocean SST products, ERSSTv5 and HadSSTv3, They documented blending techniques used to combine land and ocean data. After comparisons, they indicate C-LAST1.3 with ERSSTv5 as the preferred combination to produce China Merged Surface Temperature (CMST) data product. They show that CMST looks very reliable compared to other global surface temperature data products. The CMST data seem easily accessible via Pangaea and KNMI.

This reviewer regards CMST as a useful new product. Publication in ESSD seems appropriate. However, manuscript, what ESSD calls 'data description' needs substantial changes to shorten and refine.

Authors should use ESSD to describe and promote CMST. Nothing more. No histories of SST products, no evaluation of others' data products (e.g. BEST), just what they did to produce and validate CMST.

The authors present many users with a contradiction: description and production of an openly accessible global product, CMST, based primarily on a land product C-LAST1.3 whose description (Xu et al. 2018) remains behind a paywall. Everything user might want to know about homogenization, outlier detection and general quality control of the land product, e.g. as CRUTEM4 provided in ESSD 2014, https://doi.org/10.5194/essd-6-61-2014, remains in this case in separate non-open Climate Dynamics paper. That CMST represents a quality outcome, e.g. as in Figures 9 and 10 of this paper, seems obvious. The quality control procedures authors used to produce C-LAST remain out of reach for many users.

Unless CMST data explicitly resolve or refute hiatus or other global data oddities, user does not need to read those descriptions here. Focus on CMST, how authors built it, and its validation.

Likewise, authors do not need repeat evaluation procedures for other components they did not produce. User does not need to read here how other land ST or SST data sets evolved. We can read those histories and comparisons elsewhere. Again, unless some text pertains uniquely to CMST, user does need to see that text here.

Authors should completely avoid BE problems. They have raised valid issues, responded with useful and appropriate detail in the discussion. The issue now appears to lie with BE. Unless authors have separate information from BE researchers (in which case BE or these authors should make that information open via the discussion thread), these authors should remove BE products. Not the task for these authors to fix BE problems. Remove last column of Table 1. Remove Figure 2. When these authors reference the BE product, e.g. on line 17 of page 8, they should simply insert a footnote, something like 'despite careful efforts we could not extract reliable information from BEST. Authors focus on CMST quality control, not on BE problems.

Manuscript contains several additional redundancies. Authors should follow closely the rule: if text helps users understand CMST, keep it. If text does not pertain specifically to CMST, remove it. Authors could produce a good ESSD data description focused on CMST.