

Interactive comment on “Comparing historical and modern methods of Sea Surface Temperature measurement – Part 2: Field comparison in the Central Tropical Pacific” by J. B. R. Matthews and J. B. Matthews

Anonymous Referee #2

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Review of: Comparing historical and modern methods of SST measurement – part 2: field comparison in the central Tropical Pacific, by J.B.R. Matthews and J.B. Matthews

This paper gives an overview of some methods for measuring SST and does an analysis of data from an experiment in the tropics. The results from field experiments are useful for improving models of SST bias from different measurement methods. My major concern is that the authors suggestion of broad conclusions from a study over a brief period in the tropics only. Others such as Kent and coworkers and Folland and Parker and coworkers have done more extensive studies of the problem. Where this more

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limited study shows findings inconsistent with more extensive studies, comparisons should be made and it is possible that some improvement in the more comprehensive understanding of bias could be made using these results. But this study on its own is not sufficient evidence for changing bias estimation models.

Some particular concerns:

1. Limitations in the record: May-June 2008 for a small region of the tropical Pacific. This region is not typical of the global oceans, and a short period may not be representative of tropical air-sea interactions. It's good to do studies and necessary to limit them. But it's also good to be aware of the limitations and not suggest too general a conclusion. More data are needed for the development of models.
2. Ship intake biases are noisy, but when averaged give a bias of about 0.1°C (Reynolds et al. 2002, J. Clim, 15, 1609-1625). In the tropics where SSTs are already warm the bias would likely be less, but that does not mean that intake temperatures are unbiased.
3. All in situ SST measurements tend to be noisy due to observing practices and small ship location errors. It's not just a problem with intake temperatures. It's especially a problem with historical measurements. Proper analysis techniques can account for the noise and properly use the observations.
3. HadISST-ERSST differences in NINO3.4 have two main causes. One is the different bias adjustment as noted. The other is the different analysis methods for the long-period variations (Smith et al. 2008). Differences in the analysis methods are at least as important as the tropical bias differences.

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