

Reply to comments by Anonymous Referee #2:

We sincerely appreciate your careful reading and cutting remarks on our article. We hope our replies in the following are satisfactory.

Replies to specific comments:

> However, the issues are mainly technical and it is not clearly demonstrate or state how the
> authors found their results significant or not (noticing that only two dozen of probes have been
> tested). This is the most important point that needs to be clarified. The last part of results
> focuses on the probe structure (weights, probe wire, metal nose, etc: : :) but here also, a
> summary about the potential impacts of probe structure is needed to help the reader for oversee
> the consequences on temperature measurements. At the present stage, I do recommend the
> publication of this study but I also suggest that the authors simplify their presentation of the
> different technical issues.

We agree with many of your points. We described many aspects of the probe structure, but did not mention much about their possible impacts on temperature measurements. That's because we do not know well how each of those factors would change the fall rate. In other words, we could not omit anything without knowing which is important. The theoretical modeling of turbulent water flow around the falling probe is highly demanded for this purpose, but we are not capable of doing that by ourselves. So we tried to describe every fact we found as a first step. We believe that every systematic bias has to have reasons. That's what we tried to find. We could not clearly indicate the relative importance of the potential causes, but we think we could at least show the importance of structural differences: the weight does not determine everything. We hope our trial and results will be a base for future studies that try to identify true biases that should be explained physically and reasonably.

> - Mention somewhere the nominal depth for T-7 probes

The nominal depth is included in this revision.

>- Insert a reference for the "warm 1970s" bias (line 17 page 1815)

Two articles are cited in the revised manuscript.

>- The discussion on the probe weight (after lines 25 in page 1817) should be moved in the part
>regarding the probe structure

This part needs to be placed in the original position because we decided the number of probes to be kept for detail inspection

>- Precise the positive and negative temperature offset (lines 17-18 in page 1820)

The estimated ranges are described in the revised manuscript.

>- Page 1820, line 28: does 'is not clear' means are not significant?

Yes, almost. But we did not test statistical significance.

>- Line 8, page 1830: consider "effective" in place of "real"

We replaced "became occur" by "occurred" and omitted "from" before "when".