

## ***Interactive comment on “Uncertainty information in climate data records from Earth observation” by Christopher J. Merchant et al.***

### **Anonymous Referee #2**

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Careful, thorough and thoughtful paper. Not sure the fit to this particular journal but evidently editors have allowed it so far and - not clear to this reader - where else could it go?

Positives:

The linguistic and mathematical / statistical connections to metrology, very important reminders for our community.

The positive and detailed description of a SSM maturity matrix (which so far, for the NOAA / Bates version, seems to mostly have circulated as a Powerpoint presentation).

The very appropriate note of caution about the SSM matrix, and the overall sense of a rigorous application in an ad hoc manner according to data stream and user need.

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Suggestions:

The authors started very clearly on a general topic of observations, climate-relevant observations, and then formal CDRs. They mentioned the very strong influence and impact of reanalyses. But by the middle and certainly by the end the manuscript they had pretty much focused entirely - and not inappropriately nor unexpectedly given this set of authors and the motivations and support of ESA's CCI - on satellite data. Perhaps a reminder in the conclusions of how the 8 recommendations, and the tactics of per-datum or ensemble approaches, fit or do not fit other data sets, particularly in situ data sets.

The authors mentioned the error generation possibilities inherent in the upscaling process but they missed, at least for this reader, mention of the interpolation processes by which irregular - in space and time - observations get converted to grid spacing. This seems a very prominent process in our community - strongly evident in other ESSD papers for example (c.f. the original and gridded versions of SOCAT both in ESSD) - and one that perhaps needs explicit discussion in a document like this?

This reader notes the almost complete absence of any discussion of precipitation. Not a current CDR, as I understand (but soil moisture is?) but perhaps the most challenging and troublesome of all our climate-relevant data. The very useful examples in this manuscript relate mostly to radiances: aerosols and sea surface temperatures. We read almost nothing about the combined morass of satellite, radar, rain gauge, stream gauge, etc. data streams, often with wildly uncertain uncertainties, that constitute the basis for any of several global precipitation products. Precip represents perhaps the extreme uncertainty challenge? We should read a mention of it, even if only a subject for future work or as a reminder of the many real-world difficulties?

Finally, as an advocate of open access for data and a frequent reviewer for this journal, this reader wonders if the 8 recommendations might have some impact or appropriateness as guidelines both for data providers submitting to this journal and for reviewers

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struggling to assess the quality of the submitted products? Recommendations 1, 2, 5 and 6 seem highly relevant for example. Some of us have pushed the editors for more detailed standards (at the same time recognising as this paper clearly points out that one standard will never fit all) but I understand that mostly they (or somebody at Copernicus) check the presence absence of functioning access links. Perhaps even listing some or all of these recommendations as guidance on the ESSD web site would assist providers and reviewers (and do a nice job of promoting this paper)?

Also, one wonders if and how the recommendations pertain in an open access environment as promoted by ESSD (among others)? Most of the discussion in the paper seems to refer to a within-house exchange between CCI and reanalysis or climate modelling centres, but for some of these data (clouds, for example) one could image a larger group of less familiar users. One wonders if or how the recommendations might change with those non-specialist users in mind?

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