

Review of “A rescued dataset of sub-daily meteorological observations for Europe and the southern Mediterranean region, 1877-2012” by Linden Ashcroft and colleagues

This discussion paper outlines a collection of rescued data under the auspices of the FP7 UERRA project. The rescued data is of clear relevance and importance to a broad community of stakeholders. The data collection is described in a manner that is generally accessible to the interested expert (although see a number of comments and suggestions below). Given these considerations and that the subject matter is clearly within journal scope I would recommend acceptance of this paper following addressing a number of specific points and queries outlined below.

Major points

- 1.** I'm not sure I would agree that snow depth and snowfall are non-ECVs (p.3). As noted in the GCOS status report (I believe GCOS-194 but am writing this review offline) the ECVs can each cover multiple variables. I believe these would be treated as sub-classes of the precipitation ECV in this context. Equally, there are one or more terrestrial ECVs under which these parameters could plausibly fall. I would suggest checking this with GCOS secretariat.
- 2.** I would appreciate clarification on a number of methodological points to assure the ability of a reader to replicate / fully understand your chosen approach as follows:
 - a.** Does the “key as you see” approach extend to the keying of obviously incorrect entries or did the digitizers instead correct what they saw as unambiguous errors? If the latter what guidance was given? Regardless please be more explicit in the text p.5 lines 7-10. If it is strict key as you see this is hard to reconcile with the description of results given in Section 4.2. If I am confused so will your readers be.
 - b.** Assuming that the pages were in a variety of languages what supports were given to digitizers to account for this? This perhaps would be best addressed by an addition to the paragraph p.5 lines 19-22
 - c.** Assuming there is either a paper or a technical note describing the automated QA described in P.7 line 15 please cite it. Otherwise for strict repeatability you need to considerably expand this section (3.2) so that it adequately describes the exact chosen approaches or add a technical appendix covering this.
 - d.** Section 3.4 is a stub section and does not provide sufficient context to the reader. The reader is suddenly confronted with a flag value of 3 but in the prior text it was never mentioned what flag values were and why they were used.

The above points perhaps collectively allude to the value of the authors, with what will now be fresh eyes, reviewing anew the methodological descriptions and ensuring that they fully reflect the methodological details of the work undertaken such that a non-participant could replicate their work. This revision should be in a manner that is accessible, understandable, and comprehensive. My feeling is that details glaringly obvious to the authors, who have lived and breathed this work for a number of years, but opaque to outsiders, have been omitted.

3. It is important to be clear whether your quality assessment approach is to flag and remove or flag and retain. No quality assurance program is perfect and removing values removes the ability to revisit QA choices in future. So, I hope and trust that it is flag and retain and not flag and remove, or that at a minimum the original digitized values are available somehow. Please address this point in a revised opening to Section 3. Either it is flag and retain or you must make the raw digitized data available and document how this can be accessed to assure the longest-term value of the collection effort being described.
4. Nowhere is it mentioned whether the original images are made available anywhere (except a brief and very non-specific reference in the caption to figure 2 in an 'on request' mode which has an implicit limited lifetime of applicability). Given the lack of duplicate keying in many cases, together with issues identified in several places, I would have thought that maintaining an archive of these images would be invaluable to researchers potentially many years hence using this collection. I would therefore urge making the images available via a sticky doi and ensuring this is documented in the final version of the manuscript.
5. Figure 1 dots are very unclear against a red background and probably illegible to color-blind folks. Please revise the figure so it is much clearer and use a color-blind simulator (of which several are available) to assure accessibility prior to resubmission.
6. Figure 10 introduces a whole bunch of flag codes which are utterly incomprehensible without context. Either change the key so its intuitive labels for each case or augment the figure caption to state what each flag code means in a human understandable manner (descriptive not codes).
7. I would urge giving geographically meaningful names for each region in figure 11 (and thus table 6). Using geographically meaningful names would enable figure 11 to be standalone and thus increase its value.

Minor points

1. P.1 line 17 millions of such (add of)
2. P.2 line 18 and / or (add /)
3. P.2 line 21 economically rather than economic
4. P.6 line 14 replace variables with events – it is the events that are extremes not the variables!
5. P.6 line 28 still under development (under, not in)
6. P.8 line 19 high spatial separations (not distance)
7. P.8 line 23 large spatial separation
8. P.8 line 27 a subset of observing times ... I think would make more sense?
9. P.9 line 37 Despite being amongst the countries with (given that you go on to describe 2 countries!)
10. P.10 line 10 I would remove the paragraph break here for readability personally.
11. P.10 line 36 tails of atmospheric behaviour ...
12. P.13 line 18 data keyed by others ...

13. P.13 line 29 remove the qualitative rider 'totally'
14. P.14 line 13 the C3S 311a Lot 2 Global Land and Marine Observations Database service contract through ...
15. Peterson et al reference is missing a year in the reference list
16. Personal taste but I would present Figure 9 as something other than a pie-chart that can illicit some pretty strong reactions amongst the scientific community. There is almost always a better way to show such results in my (perhaps jaded) experience.