Review ESSD-2017-126

When possible use full doi prefix, e.g. https://doi.org/10.7289/V51Z42H4 in preference to doi: 10.7289/V51Z42H4? For many users on certain browsers, the former offers one-click access while the later requires user intervention.

The NASA Ames (.na) format seems like a legacy format of the research aviation community, still used by, for example, NCAR. The authors do a good job of explaining NASA Ames format in their Section 5 and a search in ESSD shows at least one other data set in NASA Ames format. But international surface met data, as presented in several other ESSD data sets, often come in more generic formats, e.g. .tsv or .csv, or - maintaining full metadata - as NetCDF. Provide a NetCDF version or mention a link to a translator?

NOAA download file includes useful help files.

Agree with the basic utility of these data on their own, and with the need to document logistical challenges both island and ship. Good product, hope to see it widely used. Recommend publication with some changes or additional explanations.

Specific comments

Page 4, line 5 “Global Class” research vessel. NOAA or UNOLS designation? Eliminate or explain for an international audience.

Page 6, line 4 “replaced suspicious data with flags.” In looking at the Kiritimati data file, I did not see flag values other than standard missing data designated by 9999. Did the authors insert additional flag indicators? If so, we should know their value and meaning? If not, we should know that we can not distinguish them from other 9999. data?

Page 10, section 3.2.4 Winds: Here the authors ask us to accept a very large assumption, that winds and therefore intercomparisons and corrections from a different cruise of the same ship but much farther north (in a different wind regime) and one year earlier will also apply to the ENRR data. Without a working bow anemometer for the ENRR cruise the authors probably have little choice - and this reviewer well knows the unfortunately frequent disappointment of finding ‘standard’ ship met sensors not working as advertised - but some larger context would help. In these strong ENSO or pre-strong ENSO conditions, the authors could give us a short (one paragraph?) summary of large scale wind, convection and SST conditions that would help our understanding and acceptance of wind, radiation and ocean temperature corrections? Figure 4 provides a large scale picture of SST for the entire cruise of RV Brown but we could see similar fields of surface wind or pressure anomalies or of cloud top height / temperatures as an indication of convection? If this time period represented an anomalous period for winds or convection then we have greater reason to worry about corrections based on ‘mean’ conditions or literature values? In other words, other than for a very warm SST, do the authors consider this time period normal (for the location, season, ENSO index, etc.) or highly unusual?

Page 12, Section 4: Surface flux calculations. Do we need a sentence that gives the explicit formulation of this version of the COARE algorithm?

After reading this section this review suspects some circular logic involved? Use radiosonde data prior to launch to correct or validate some aspects of surface met data. But (and presumably documented in the upper air data set) then use the surface met data to properly initialise the radiosonde data. Then, to calculate LWD contribution to fluxes, use the radiosonde data, at least for H2O, to estimate column profile of RH as it would influence LWD at the surface if measurements had included direct LWD. Somehow this reviewer gets the uncomfortable feeling that upper air data corrected originally by surface data then became themselves an upper air input to a surface calculation? Perhaps unavoidable but not ideal, deserves notice? Also, rather than assuming vertical cloud distributions centered at 1 km (about optical depth I concede the authors assumptions), the radiosonde RH profiles probably indicate cloud layers, at least generally? Or, would these assumptions and calculations prove insensitive to cloud layer height?

As I remember, NCAR and Vaisala originally published a correction to COARE radiosonde RH values, particularly to address erroneous surface dry layers. Now we use the radiosonde pre-launch surface RH values to calibrate surface RH sensors?

Page 12, line 9: Fairall et al 1996 does not represent the most recent version of the COARE bulk flux algorithm as implied in this sentence? Later the authors cite Edson 2013 for more recent versions?

The meat of this paper lies in the figures and tables. Tables excellent for the most part, very helpful. Figures likewise instructive and helpful, particularly the frequency distributions of various sensor differences. Although the text maintains a very good record of reporting uncertainties, the figures often fail to show uncertainty. Figure 13 represents a nice exception that proves the point? Showing uncertainty bands would make some figures unreadable? We need either explicit inclusion of uncertainties where appropriate or valid explanation of their absence? Perhaps particularly for figures 19 and 20?

Figure 8, RH does not go much higher than 95% during periods of heavy rain?

Figure 10, showing the rain events would also prove helpful here?

Figure 20, not clear why panel C (lat, lon) has relevance to upper two panels?

Table 6, vertical grid for RRTM: not sure the utility of this?