

General comments

This paper describes a dataset of winds, surface currents and ocean waves collected during the ACE expedition that circumnavigated the Southern Ocean from December 2016 to March 2017. The ocean wave observations from the WaMos-II wave and surface current monitoring system are particularly novel and the fact that the sea state and wind observations were made at the same time make these an interesting and extremely useful dataset for scientists studying air-sea-ice-ocean processes in the Southern Ocean. Such datasets are rare in the Southern Ocean and tend to be collected along regular shipping tracks. The datasets comprise both oceanic and atmospheric conditions over the three to four months and these data constitute a valuable resource that will be of interest to a variety of readers.

The manuscript is well-written and well-structured. The authors provide a good overview and introduction that synthesizes the literature on air-sea-ice-ocean processes in the Southern Ocean. They provide the rationale for collecting and publishing these data by highlighting the lack of in situ observations for the region and the consequences of the lack of observational data. The figures are well-presented, informative, and easy to follow. The manuscript supports the publication of these data sets.

The datasets are available and accessible at the links referenced in the abstract and under the "Data availability" heading. At these links, the datasets are well-described and straightforward to access.

I have some very minor comments detailed below:

Line 106-107: Do you have an estimate of what proportion of the data (if any?) is not processed due to the ocean being too smooth? Is this much of an issue in the Southern Ocean?

Line 128: "modes" = "mode"?

Line 180: is there a standard deviation or other measure you could include to show the variability of these variables over the 20-30 year time period? (This might be useful to

include in Fig 6 to put your instantaneous observations in context with the interannual variability?)

Figure 5: perhaps add a contour showing the sea ice edge to the figures that show wave height to highlight the attenuation you mention in line 195? (Figure 5c and/or Figure 5d).

Line 202: "patter" = "patterns"

Line 202: maybe add either the polar front or the legs to the figures showing surface currents to highlight the region you are describing here? It would be useful to reference Figure 5f here.

Figure 7: c and/or d - add the sea ice edge (or include the shading from Fig 1) so we can visualize where the sea ice is complicating estimations.

Line 283: Is there any other literature on WaMoS-II surface current observations that provides any assessment of the quality of the current observations? I.e. are you able to say anything about the quality of the WaMoS-II vs altimeter current measurements? How different are the current estimates - maybe it isn't appropriate to directly compare these quantities?