

Interactive comment on “Volume distribution for particles between 3.5 to 2000 μm in the upper 200 m region of the South Pacific Gyre” by L. Stemmann et al.

Anonymous Referee #3

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The manuscript bgd-2007-0130 by Stemman et al is an interesting piece of work that undertakes three main components: the construction of particle size spectra involving a wide range of size classes, the characteristics of these spectra in two locations of the Pacific and their daily dynamics.

The first component is not totally new after the work by Jackson but it is resolved in the manuscript with a high degree of detail and rigor what adds new components worth to be published. However, there is a significant lack in the discussion. It is assumed that manipulation of the sample for small particles does not alter the size distribution. The manipulation implies capturing with a bottle, filling a flask, keeping the flask in a rotating

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table, taking the sample to the HIAC counter, etc. Any of these manipulations has the potential to alter the size distribution that existed in situ. Either there is a strong and convincing argument to state that no breakage/aggregation occurs in the manipulation process or we must accept that we really do not know what is in situ the size spectrum of small particles. This is a point that should be widely discussed in the paper since it affects half of the results presented. The size spectra obtained for small particles could well be the rather trivial Junge distribution observed in aerosols or the size of stars and now present in the small particles just because of manipulation.

The second component is of high value. The UVP is an exceptional equipment and the information it provides is unique for the reasons explained in the paragraph above. It provides size spectra that are not affected by manipulation and we are sure correspond to the in situ size distribution of particles. These type of data are very scarce and deserve to be published. Large particles (and their size distribution) play a significant role in ocean fluxes and the information provided in the manuscript can be useful for scientific communities beyond that interested in particle dynamics.

The third component points out the existence of significant daily cycles of particles. More methodological detail is needed on this point to assess the evidences provided. It is not clear in the methodologies what is the time frequency of sampling, key to evaluate if the cycles were well resolved. This is critical in figures 4 and 5 which seem quite impressive in the manifestation of daily cycles. However, if the sampling was made only at the white and black bars presented in the figure (this needs better clarification in the future paper) then the highs and lows of the figure do not coincide with the sampling time. This is very visible in figure 4.c and especially in figure 5.c. Being this the case, the evident peaks of these figures are not data but an interpolation that extend tendencies for places without data and, consequently, the visual message of the figures is wrong. This needs to be clear before future readers can evaluate how convincing are the evidences provided.

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