



Interactive comment on “Particle size distributions by laser diffraction – Part 1: Sensitivity of granular matter strength to analytical operating procedures” by F. Storti and F. Balsamo

J. Mason (Referee)

mason@geography.wisc.edu

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This is an important contribution, given the growing and largely uncritical use of laser diffraction particle size analysis. For many samples, the results of this method may be sensitive to specific details of the measurement procedure. This study does not exhaustively consider all the factors that may affect the results, but it does include many of them. The results support the conclusion that a rigorous protocol is needed to identify appropriate measurement conditions for each new type of sample.

I noted no major flaws in the methods or interpretations of results. I have listed a series of issues below where some clarification could be provided through minor revision.

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In addition, I have attached a copy of the manuscript, annotated with minor wording changes or corrections.

The manuscript is quite dense and has to be read slowly and carefully, but I believe this is mainly a consequence of the need to describe a complex set of experiments. The interpretation sections following each set of results are very helpful.

Issues that could be addressed with minor revision:

1. The flow chart in Figure 24 is certainly helpful in understanding the conclusions, but it would be helpful to have a similar graphical portrayal of the procedures used in this study, for reference when reading sections 2 and 3. An alternative approach might be a table, which could also provide a key to the many abbreviations used to identify subsamples.
2. Beyond the two materials tested here, the authors could suggest a number of other sediments or rocks that may fall in the “weak” and “strong” categories.
3. The test of chemical dispersant effects is quite limited, since other dispersants such as sodium metaphosphate solutions are often used in particle size analysis, along with various pretreatments such as organic matter removal. This is not a problem for this paper, since the materials tested have low clay mineral and organic matter content and therefore these additional chemical dispersion techniques would probably have little effect. The authors should add a note, however, indicating that additional tests of chemical dispersion methods would be needed for many sample types.
4. The basis for considering ethanol as a chemical dispersant should be stated, along with the effect it is expected to have on the samples. I assume this is related to its nonpolar nature, as opposed to water, but I would like to see more explanation of this. Also, “ethylic alcohol” should be ethanol (or ethyl alcohol)..
5. “Measurement precision” would be preferable to “Measure precision,” throughout the ms.

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6. References. There are many other papers on laser diffraction particle size analysis; however, in a quick check through those I have available, I don't see any that specifically deal with measurement condition effects that aren't cited here.

Please also note the supplement to this comment:

<http://www.solid-earth-discuss.net/1/C29/2010/sed-1-C29-2010-supplement.pdf>

Interactive comment on Solid Earth Discuss., 1, 93, 2009.