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Atmospheric Measurement Techniques Discussions

Interactive comment on "An automatic collector to monitor insoluble atmospheric deposition: an application for mineral dust deposition" *by* B. Laurent et al.

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The manuscript presents a customized system to collect bulk deposition samples unattended for several months, if one sample a week is taken. This will be great for sampling at remote locations. Of course, there is no perfect system to collect deposition for all purposes. The CARAGA system suits best the collection of the non-soluble non-organic fraction. This will suit a certain number of atmospheric and geological-related studies. As it misses the organic fraction, by burning, and the soluble fraction, as much of it will leach out from the washing, CARAGA will be less adequate for ecosystem impact studies. The paper also goes into tests that were done to select the type of

filter to be used and the protocol for burning these filters and weighing the minerals left. In addition, an almost two year time series from Frioul Island is presented and compared to previous determinations of deposition using other systems. It would have been nice to have done the reference collection simultaneously as well, but I understand the probable logistical and budgetary constraints. I only have minor comments; mostly needed clarifications that need to be addressed before a positive recommendation for publication. In addition, although the paper is neatly written, an English editor needs to go through the manuscript.

Line 37. Deposition does NOT control atmospheric concentration. Concentration is one factor controlling deposition.

Methods. There is no universally perfect device for collecting aerosols, or measure deposition. The CARAGA will not be suitable for ecosystem analyses of the deposition when the nutrients that are supplied are a key issue. Since a large amount of the bioavailable nitrogen, phosphorus, silica and even carbon will be leached with the water (or ethanol 20%) added and the leachate is discarded, there will be an underestimate of the deposition flux of these materials. Organics will also be burned. Probably the weight percentage of the removed chemicals is small and thus should not affect much total mass flux determination.

Line 232. All these filter types with the exception of the polycarbonate membrane are meshes without a nominal defined pore size. Thus, the porosity is some mean value, but larger particles, especially in a preferred direction-dimension could pass through. Has a test been made? I would like to see comments on this.

Line 244. The mass variation is 0.3 mg. How is this compared to the amount of collected material in 1 week of background deposition (without Saharan dust?). It could become critical at certain time. For instance if the minimum collected has been 1e-3 g m-2 in one week, this means that what was actually collected is 0.2 mg during that week because the funnel is 0.2 m2. This is even below the 0.3 mg error!!

Line 256. In many situations these are important background components of aerosols. I would like to see a discussion, even if based on literature estimates of the possible interference.

Line 280. Are the filters first dried, say at 60° for 24 h, before weighing? If the filters contain a certain amount of moisture weighing is not accurate and readings tend to be erratic.

Figure 1. The solar panel seems to be placed at a rather suboptimal angle. However, nothing is to be said if the CARAGA has been operating for two years without a problem.

Figure 4. To appreciate the error with respect to the lower measurements perhaps a log scale for deposition would be more suitable. My recommendation is to have two plots one with a linear y-axis and the other with a log y-axis.

Figure 5a. The no error bars for Jan, Nov and Dec is misleading as only data for 1 year is available.

Figure 5b. Seeing the very large variability in the longer time series of Ternon et al. (2010), the conclusion is that there is a very large interannual variability. If seasonal patterns need to be inferred, it is clear that a much longer time series is needed, and that the annual pattern observed in Fig. 5a. does not mean much.

Table 2. It seems that at 550° some organic matter not belonging to the filter is being burned. Has it been estimated if this is consistent with the expected organic matter in the sample? It should be done, just to make sure that the temperature and burning time is right.

Table 3. Why are the filters for the lab test 27% heavier that the filters used for the Frioul tests?

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 2299, 2015.