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Interactive comment on "Size distribution of EC and OC in the aerosol of Alpine valleys during summer and winter" *by* J.-L. Jaffrezo et al.

Anonymous Referee #1

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General comments: This work compares EC/OC measurements made by two collocated samplers (a filter sampler versus an impactor sampler). It also investigates the EC and OC size distributions at two locations in winter and in summer for the purpose of probing formation and evolution processes involving EC and OC. I feel that the authors need to address the following issues before the paper can be accepted for publication in ACP.

1. Abstract: "The comparison of concentrations obtained for samples collected in parallel with impactor- and filter-based methods indicate that the correction of pyrolysis seems to work for the impactor samples despite non even deposit". Such a statement is vague in terms of information quality. Readers have to dig deep into the paper to find

out what criteria are used to derive at this statement. I would like to see a more quantitative and specific description of the comparison results. 2. Section 3. In this section, the authors compare EC and OC measurements between the filter-based samples and the impactor samples. A comparison of TC (sum of EC and OC) should be included. TC measurements are known to be independent of thermal analysis methods and do not require uniform aerosol deposits. Discrepancy between the two sets of TC measurements can be conclusively attributed to differences in the sampling methods. This will in turn help to discern how much of OC overestimate by the filter sampling method is related to sampling and how much is related to bias stemming from inaccuracy of setting the OC/EC split in the thermal analysis.

A deeper analysis of the EC comparison could be made from their measurements. EC, as measured by the thermal/optical method, consists of EC originally present in aerosols and charrable OC. Both EC and charrable OC are expected not to suffer from either positive or negative sampling artifacts due to their nonvolatile nature. A slope of 0.75 in Fig. 5 indicates that EC by impactor sampling was consistently lower than EC by filter sampling. This could be attributed to either a too early OC/EC split in the filter samples or a too late OC/EC split in the impactor sample or a combination of both. An overly late split is possible in the impactor samples if one considers the following details. The individual aerosol deposit dots are smaller than the cross area of the laser beam that is used to monitor filter transmittance (T). As a result, the impactor filter T detected by the instrument is likely higher than the T, had the aerosol deposit dots uniformly covered the filter. As a result, it took longer time to return to the initial T and the split was overly delayed.

3. In discussions of size distribution characteristics, the term mass mean aerodynamic diameter (MMAD) is a very useful parameter. The values of MMAD for OC and EC should be given in the text to facilitate comparison of their research results with other future studies.

4. Figure 11 shows a special case of size distribution characteristics where sulfate

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peaked in the coarse mode. The authors indicated other cases are more classical. I suggest adding a plot in Figure 11 to show a more classical case for comparison.

Minor issues: 1. A highly relevant paper in related to the discussion of charring of OC (Chow et al., 2004, Environ. Sci. Technol. 38, 4414-22) should be cited in the paper.

2. Please specify the cutoff sizes for the 13-stage Dekati impactor in the text.

3. Missing references: Turpin, 1999; Dreher, 2000.

4. The reference Yu et al has the wrong publication year. The correct year is 2002.

5. pp3782, line 14, “than” should be “same”.

6. pp3785, line 12, the use of “interesting” is puzzling.

7. pp2788, line 9, “february” should be “February”.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 3773, 2005.