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Interactive comment on "Seasonal variations of the Water Soluble Organic Carbon massfraction of aerosol in two valleys of the French Alps" *by* J.-L. Jaffrezo et al.

Anonymous Referee #3

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Overview: The article investigates an interesting topic, water-soluble organic carbon in two alpine valleys. The topic is appropriate for discussion in ACP, and the presentation and organization are quite good. Methods and analyses are presented clearly. Generally, the authors present, discuss, and interpret the data in a reasonable and supportable manner. A few conclusions lack convincing evidence or clear discussion, and these are detailed in the specific comments below.

The authors present original results and develop new conclusions concerning the factors governing WSOC fraction, especially at low temperatures. They appear well aware

of the work of other groups, using them as reference and for comparison with their conclusions.

Equations, figures and graphs were clear and concise for the most part. One area of issue was changing the colors that represent the two valleys. The color coding appeared to change in Figure 11.

Specific comments: Page 4001, paragraph beginning line 16, description of study purpose in examining effect of traffic routing on valleys. This level of planning is admirable and should yield some very interesting results. However, the effect of the change in traffic patterns is not discussed elsewhere in the paper. This should be mentioned during the discussion of results. If no change was observed, that is also an important finding.

Pages 4002 and 4003, description of sites. Please discuss the implications of the different activities in each valley for the emissions. With such an extensive study, surely an emission inventory must have been done?

Page 4006, line 14, “samples are losing EC.” Another possibility is that the samples lose some material that would be MEASURED as EC but is not truly EC.

Page 4010, line 12, “This suggests a strong correlation with changes in temperature.” Were there significant differences in temperature in winter 2003? Also, Figure 5 is given as evidence that there is a clear seasonal trend of WSOC fraction at both sites. My interpretation of the data would be less ambitious: a clear seasonal trend is visible in the data from the Saint Jean valley while the data are consistent with but not conclusive of a seasonal variation at Chamonix.

Page 4013, line 14. “The impact of imported air-masses in the valleys in summer...” The data presented here could be an important finding, but the hypothesis is not formulated nor assessed clearly. Perhaps there is a clear explanation for the DCA fraction of WSOC: some temperature-dependent rate plus some transported fraction. What ex-

ACPD

5, S1523–S1525, 2005

actly was demonstrated in the Brulfert studies– not just “some impact”, but how much was transported? What expectation would be developed for the amount of transported OC and is that consistent with the results presented here? Why would it produce a difference in temperature breakpoint and not random noise?

Page 4014, line 21. “Residential biomass burning is a significant source...” Surely something more quantitative can be developed, perhaps based on the total amount of wood used. What about the contribution of traffic emissions to the two valleys?

Page 4015, line 16. “Even if polyacidic compounds were present in larger proportions...” This statement, and the surrounding discussion, are not clear. It is apparent that the authors attempt to evaluate the idea that OC may be formed through cloud processing. It is not apparent how well this hypothesis can be supported by the data presented here, or what further experiments the authors would suggest for the extensive testing required.

Page 4016, line 18, “The ratio observed... in our study most probably includes additional sources of potassium.” What would these be?

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 3999, 2005.