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Size distribution of EC and OC in the aerosol of Alpine valleys during summer and winter

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Abstract. Collections of samples were conducted for the determination of the size distributions of EC and OC during the intensive sampling campaigns of the POVA program, in two Alpine valleys of the French Alps, in summer and in winter. The comparison of concentrations obtained for samples collected in parallel with impactor- and filter-based methods is rather positive with slopes of 0.95 and 0.76 for OC and EC, respectively and correlations close to 1 (0.92 and 0.90 for OC and EC, respectively, n=26). This is an indication that the correction of pyrolysis seems to work for the impactor samples despite non even deposits. The size distributions of the concentrations of EC and OC present large evolutions between winter and summer, and between a suburban and a rural site. In winter, an overwhelming proportion of the mass fraction of both species is found in the droplet and accumulation modes, often (but not always) in association with sulfate and other chemical species resulting from secondary formation processes. Some indications of gas/particles exchanges can be found for the other parts of the size spectrum (the Aitken and super micron modes) in the case of the rural site. In summer, the changes are more drastic with, according to the case, a dominant droplet or accumulation mode. Particularly at the rural site, the large extent of processing of the aerosol due to gas/particles exchanges is evident for the Aitken and super micron modes, with increasing of the OC mass fractions in these size ranges. All of these observations give indications on the degree of internal vs. external mixing of the species investigated in the different modes.

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