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Seasonal variation of PM_{10} main constituents in two valleys of the French Alps. I: EC/OC fractions

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Abstract. Daily PM_{10} samples were collected at two urban sites within two valleys in the French Alps (Chamonix and St Jean de Maurienne) during a period of two and a half years. The carbonaceous species EC (elemental carbon) and OC (organic carbon) were analysed to investigate the possible sources of EC and OC, and their seasonal variations. Mean OC concentrations are in the very high range of concentrations measured for other European sites, and represent at least one third of the PM_{10} mass on each site. On the basis of the comparison between EC and OC concentrations with several tracers, we were able to show that their main sources are local primary combustion sources. Biomass burning emissions (residential heating) have a significant impact on OC concentrations while heavy duty traffic emissions have an impact only on EC concentrations. Finally, we estimated the contribution of SOA (secondary organic carbon) to OC, using the EC-to-OC primary ratio method (Castro et al., 1999) and demonstrated that the calculation of SOA mass with this method is highly uncertain, if the hypothesis of a constant primary EC-to-OC ratio is not very closely examined.

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