

Review of H. Diemoz et al., Transport of Po Valley aerosol pollution to the northwestern Alps. Part 1: phenomenology

General comment

The manuscript describes in detail the phenomenon of aerosol transport from the Po basin into the Aosta valley, investigated both by a fairly comprehensive instrumentation and from a modeling perspective. This effect is of universal importance for air quality dynamics in Alpine valleys. While the study does not reveal significant new findings about the phenomenon, it adds another valuable data set and discussion to the scientific literature.

The manuscript is well structured and written coherently, the scientific questions are clearly set at the beginning and the analysis is focused on their respective answers in the conclusions. Three case studies are investigated thoroughly with respect to available measurements and models.

Besides some very minor comments below, I do not see any further obstacle on the way for publication in ACP.

Specific comments

p9, Fig. 4 and all subsequent figures showing heat maps. The blue-yellow-red color maps (diverging color maps) are not ideal for the sequential type data of e.g. backscatter ratios. Sequential color maps with monotonous increase in luminance would be a better alternative here.

p20, 112pp. If only daily averages from August 26 until August 31 are considered, as for the hourly data in Fig. 4, the increase is less pronounced.

p22, Fig. 9b. The red/blue contours are really difficult to distinguish, but I also acknowledge this might be a hard visualization task.

p22, 15pp. The winter study seems a little more complex than the summer/spring studies. As the authors point out, the synoptic wind from the Po basin is mainly above the very stable PBL, so are the Aosta aerosols really all advected and mixed down to the surface? Maybe the contribution of local emissions is of more significant relevance here? Indeed, the daily cycles of measured PM10 surface concentration in Aosta seem to be influenced by local emissions (traffic, heating, etc.). However, I am no expert in atmospheric chemistry to evaluate the significance of the Nitrate and Ammonium percentages during Jan 27 and 28 in Aosta as an indication for air mass origin.

p34, 117. Maybe the two cases for air quality degradation could be distinguished more clearly here, i.e. thermally driven winds in summer/spring and synoptic winds in winter in stable PBL conditions with no surface wind.

Technical comments

p16, 111. ... in a few hours.

p34, 129. ... regime is established.