Supplement of Atmos. Chem. Phys. Discuss., 15, 6851–6886, 2015
http://www.atmos-chem-phys-discuss.net/15/6851/2015/
doi:10.5194/acpd-15-6851-2015-supplement

Atmospheric Chemistry and Physics Discussions

Supplement of

Wet scavenging limits the detection of aerosol–cloud–precipitation interactions

E. Gryspeerdt et al.

Correspondence to: E. Gryspeerdt (edward.gryspeerdt@uni-leipzig.de)

Supplementary Information

E. Gryspeerdt, P. Stier, B. A. White and Z. Kipling

February 16, 2015

A Influence of humidity on AOD

Whilst wet scavenging generates a negative correlation between AOD and precipitation, an increase in humidity can result in an increase in AOD. These plots show the spatial pattern of the changes in aerosol dry mass and water content in the study region and around the composite convective system.

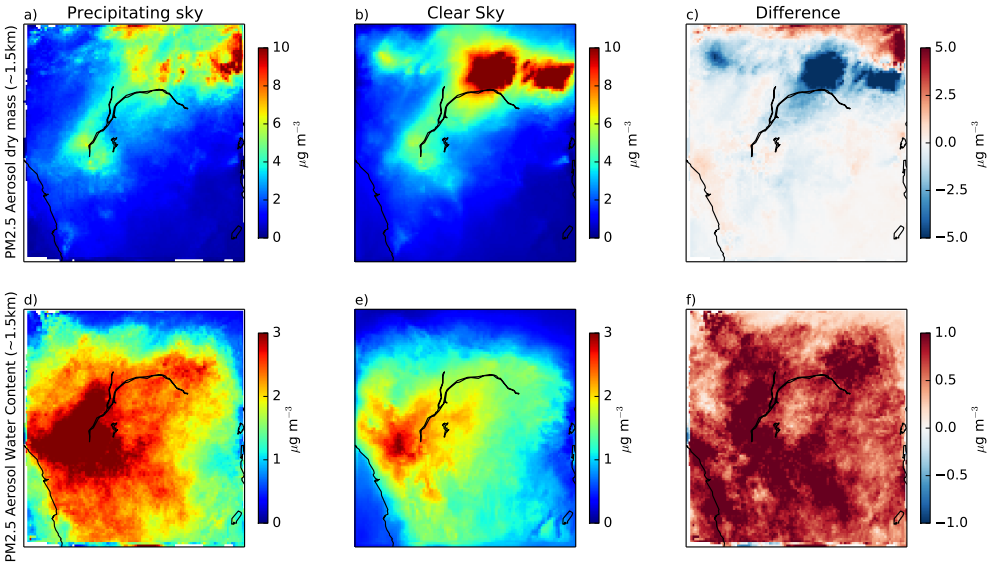

Figure A.1: PM2.5 aerosol dry mass in the study region in precipitating ($>0.1\,\mathrm{mmhr}^{-1}$ - a) and clear (b) skies. The difference between them is shown in (c). The bottom row of plots are the same, but show the absolute values (d,e) and the changes (f) in PM2.5 aerosol water content. The aerosol dry mass and water content are shown from a model level at about 1.5 km.

Fig. A.1 shows that in precipitating locations, there is an increase in aerosol water content compared to the non-precipitating region, whilst there is a decrease in the aerosol dry mass in the precipitating skies (except for a small

region in the north-east corner of the domain). This suggests that the small increases in AOD in the precipitating skies shown in Fig. 4 are primarily due to increases in aerosol water content.

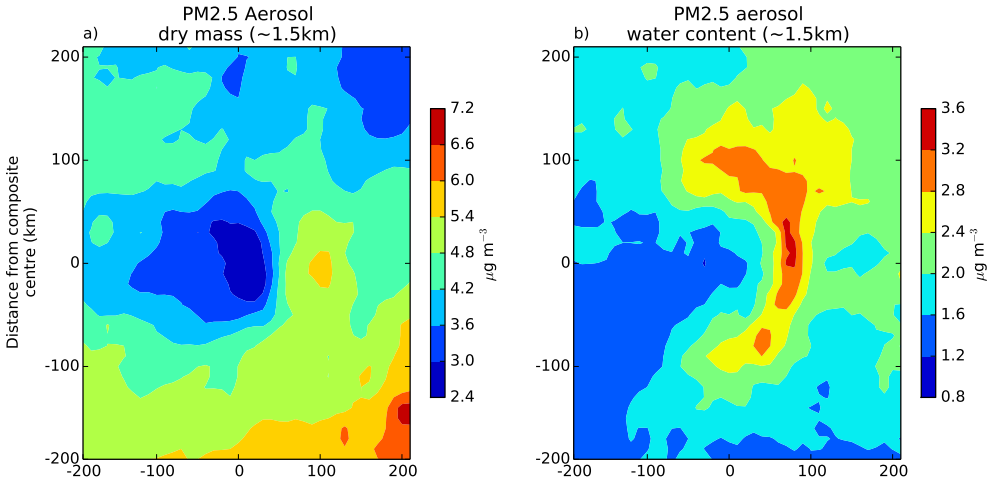

Figure A.2: The PM2.5 aerosol dry mass around the composite convective system (a) and the PM2.5 aerosol water content also around the composite system(b) shown in Fig. 5. The aerosol dry mass and water content are shown from a model level at about 1.5 km.

Fig. A.2 shows that the decrease in AOD at the centre of the composite convective system shown in Fig. 5 is due to a reduction in aerosol dry mass, as would be expected from the wet scavenging of aerosol. The increases in AOD at the leading edge of the composite can be seen in Fig. A.2 to be primarily due to an increase in aerosol water content, which also shows a strong increase at the leading edge of the system.