Supplement of Atmos. Chem. Phys., 21, 799–811, 2021
https://doi.org/10.5194/acp-21-799-2021-supplement

Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

Size-resolved aerosol pH over Europe during summer

Stylianos Kakavas et al.

Correspondence to: Spyros Pandis (spyros@chemeng.upatras.gr) and Athanasios Nenes (athanasios.nenes@epfl.ch)

Table S1 Concentrations of PM_{10} dust and its components at the boundaries of the domain

Species	North	South	East	West
Dust	0.282	0.94	0.94	0.282
Calcium	0.0072	0.024	0.024	0.0072
Potassium	0.0045	0.015	0.015	0.0045
Sodium	0.0736	0.038	0.038	0.0736
Magnesium	0.0027	0.009	0.009	0.0027

Table S2 Characteristics of the eight selected sites

Site	Type of site	Dust levels	Sea salt levels	Location in Europe
Finokalia, Greece	Remote	Low	High	South
Cabauw, Netherlands	Rural	High	Low	North
Melpitz, Germany	Rural	High	Low	North
Mace Head, Ireland	Coastal rural	Low	High	North-west
Bologna, Italy	Urban	High	Low	South
Brussels, Belgium	Urban	High	Low	North
Paris, France	Urban	High	Low	West
Iza, Ukraine	Rural	Low	Low	East

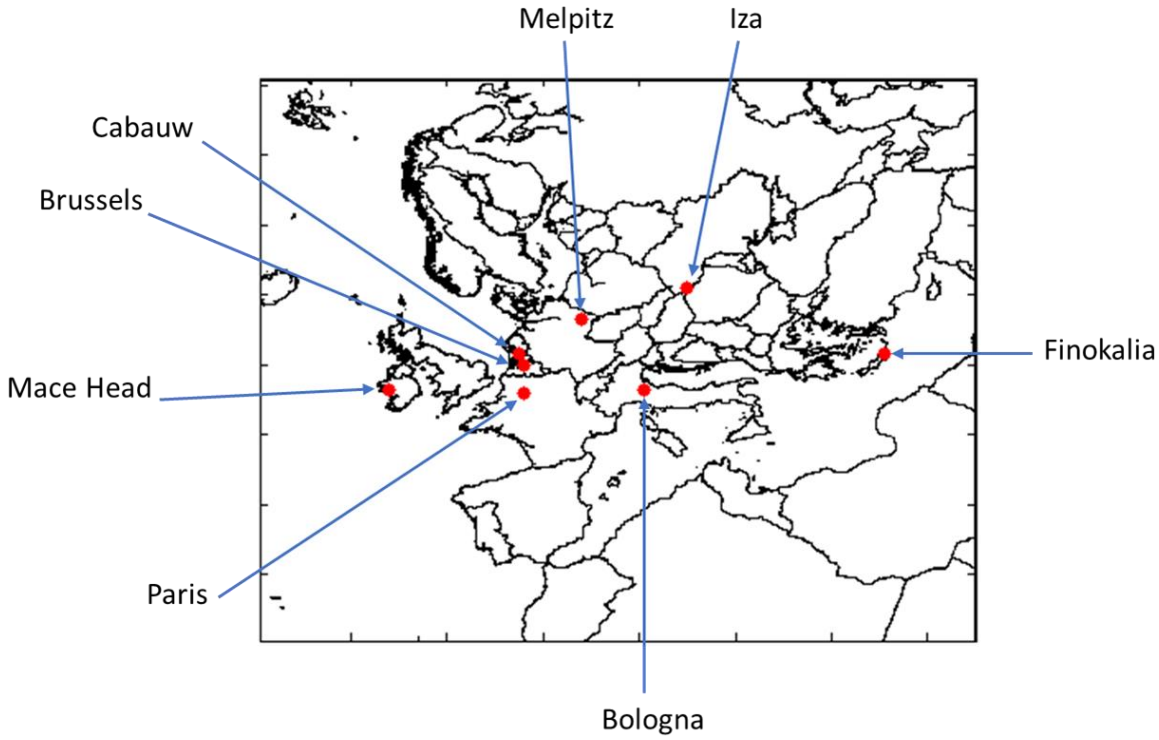

Figure S1. Position of the examined eight different sites.

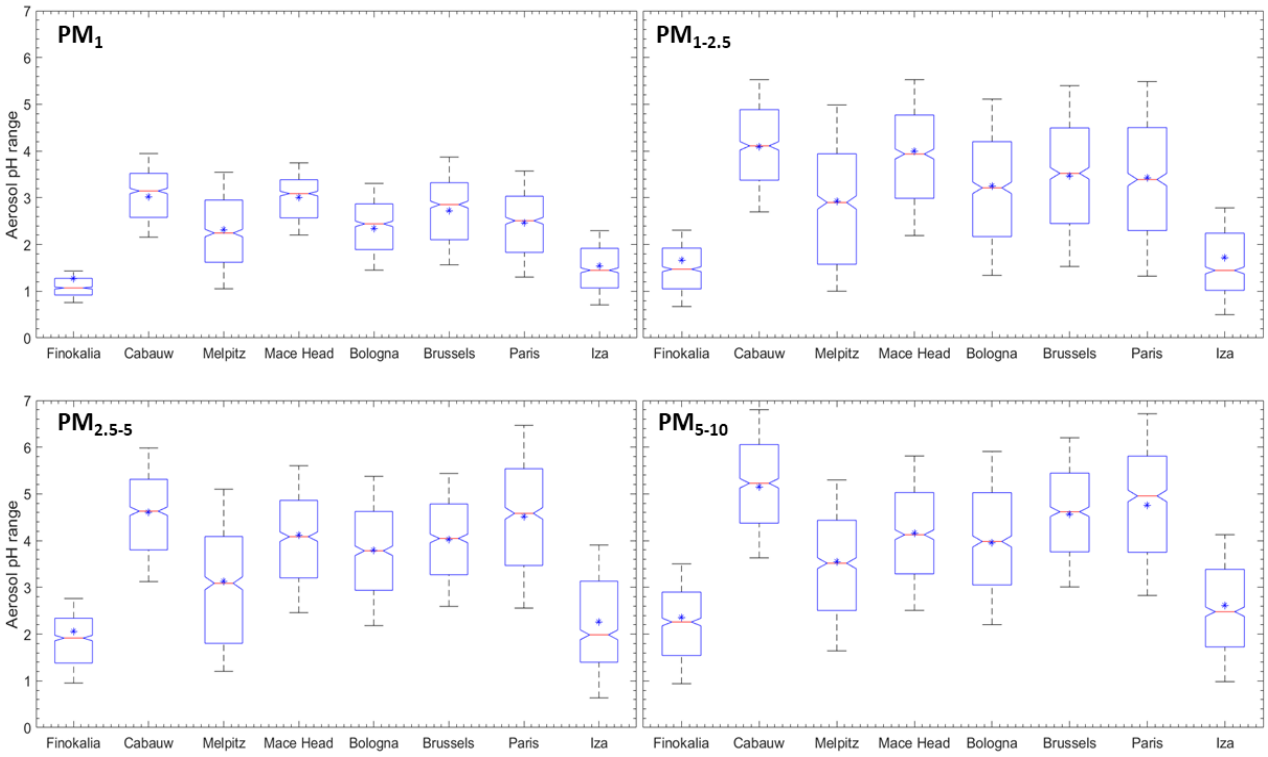

Figure S2. Box plots for hourly pH values for the examined particle size ranges and for the eight different sites for the base case simulation. The red line represents the median, the star is the mean value, the upper box line is the upper quartile (75%), the lower box line is the lower quartile (25%) of the pH distribution. The upper whisker line is for the 90% of the pH distribution and the lower whisker line for the 10%.

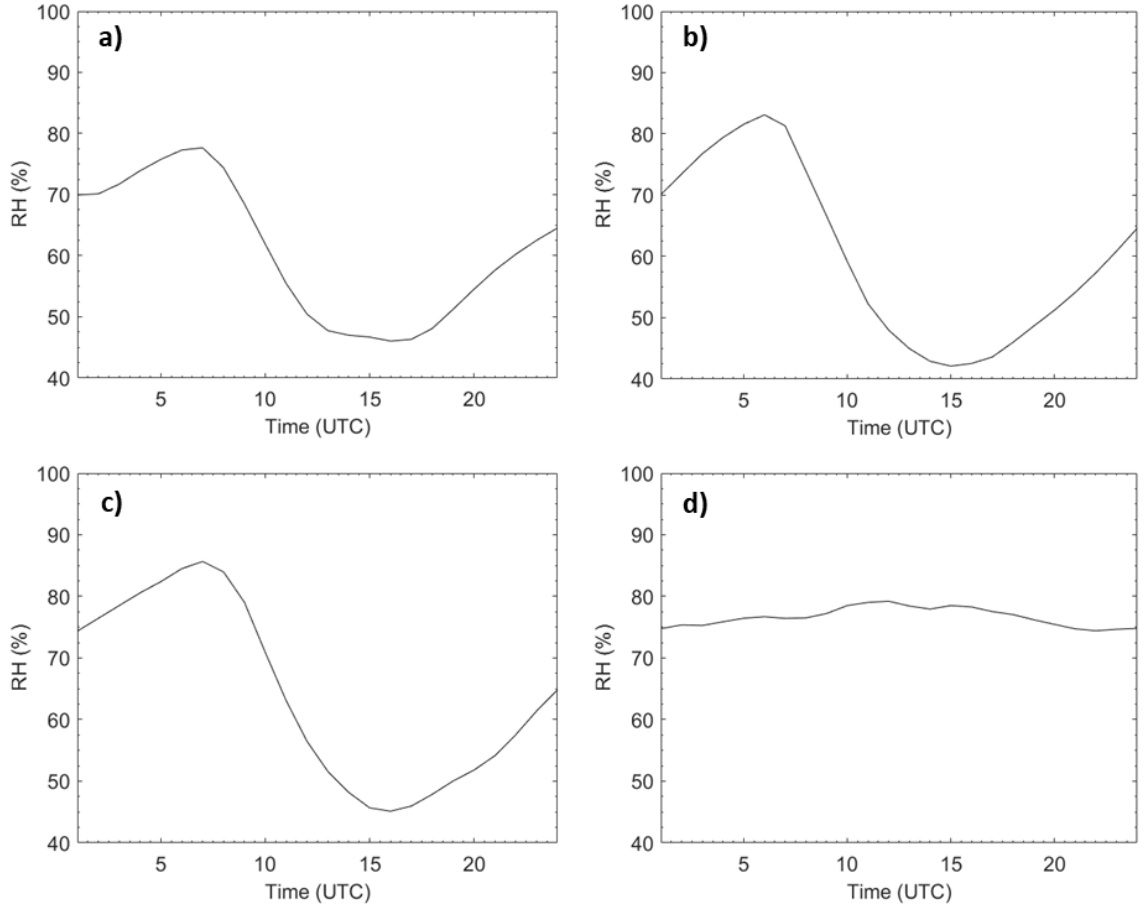

Figure S3. Relative humidity (RH) diurnal profiles for **a)** Cabauw, Netherlands, **b)** Melpitz, Germany, **c)** Paris, France and **d)** Finokalia, Greece.

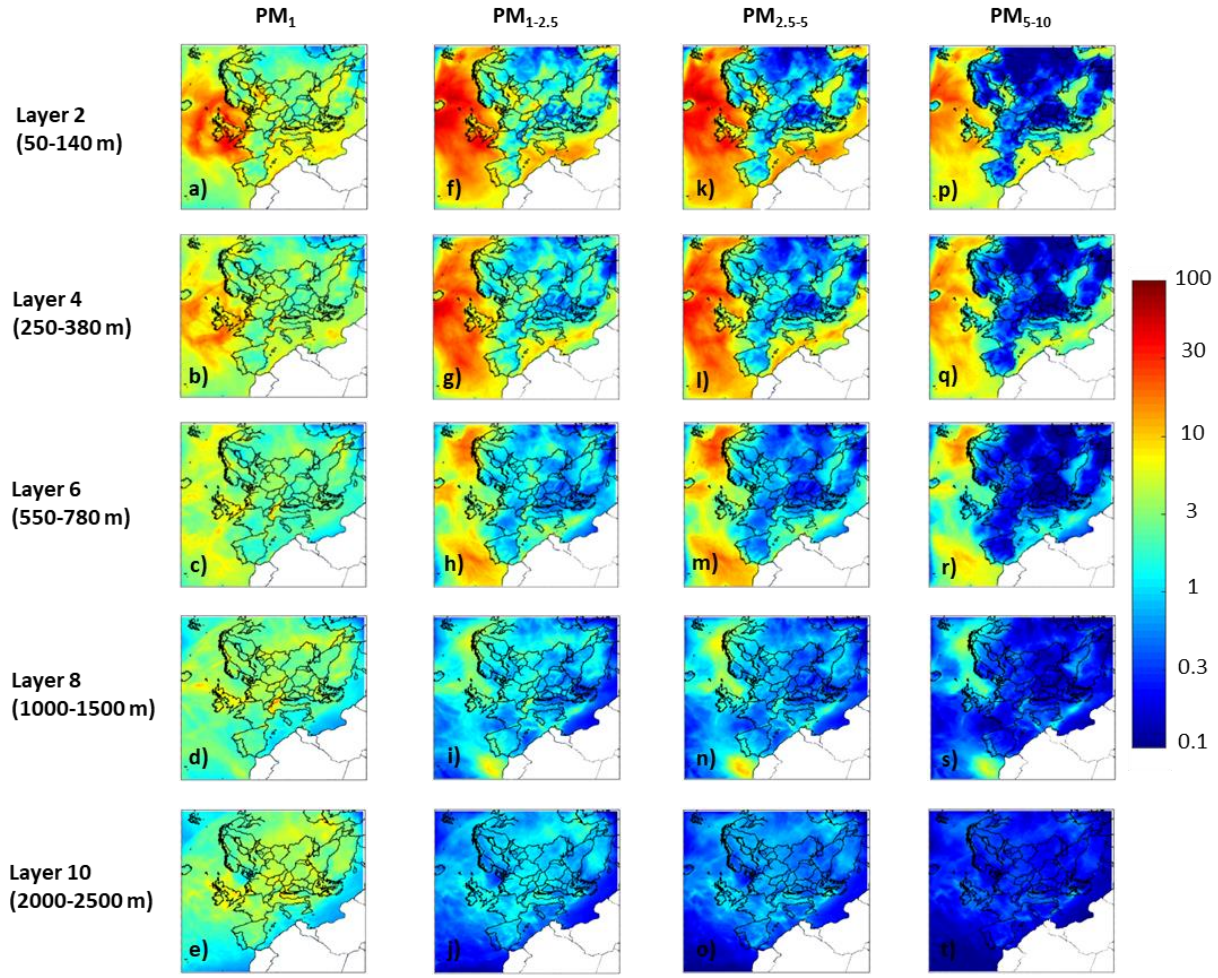

Figure S4. Average predicted aerosol water content (in μg m^{-3}) for different size ranges and altitudes: **a), b)**, **c)**, **d)**, **e)** for PM_1, **f)**, **g)**, **h)**, **i), j)** for $PM_{1\text{-}2.5}$, **k)**, **l)**, **m)**, **n)**, **o)** for $PM_{2.5\text{-}5}$, **p)**, **q)**, **r)**, **s) t)** for $PM_{5\text{-}10}$ for altitudes: 50-140 m, 250-380 m, 550-780 m, 1000-1500 m, and 2000-2500 m for the base case simulation during May 2008.

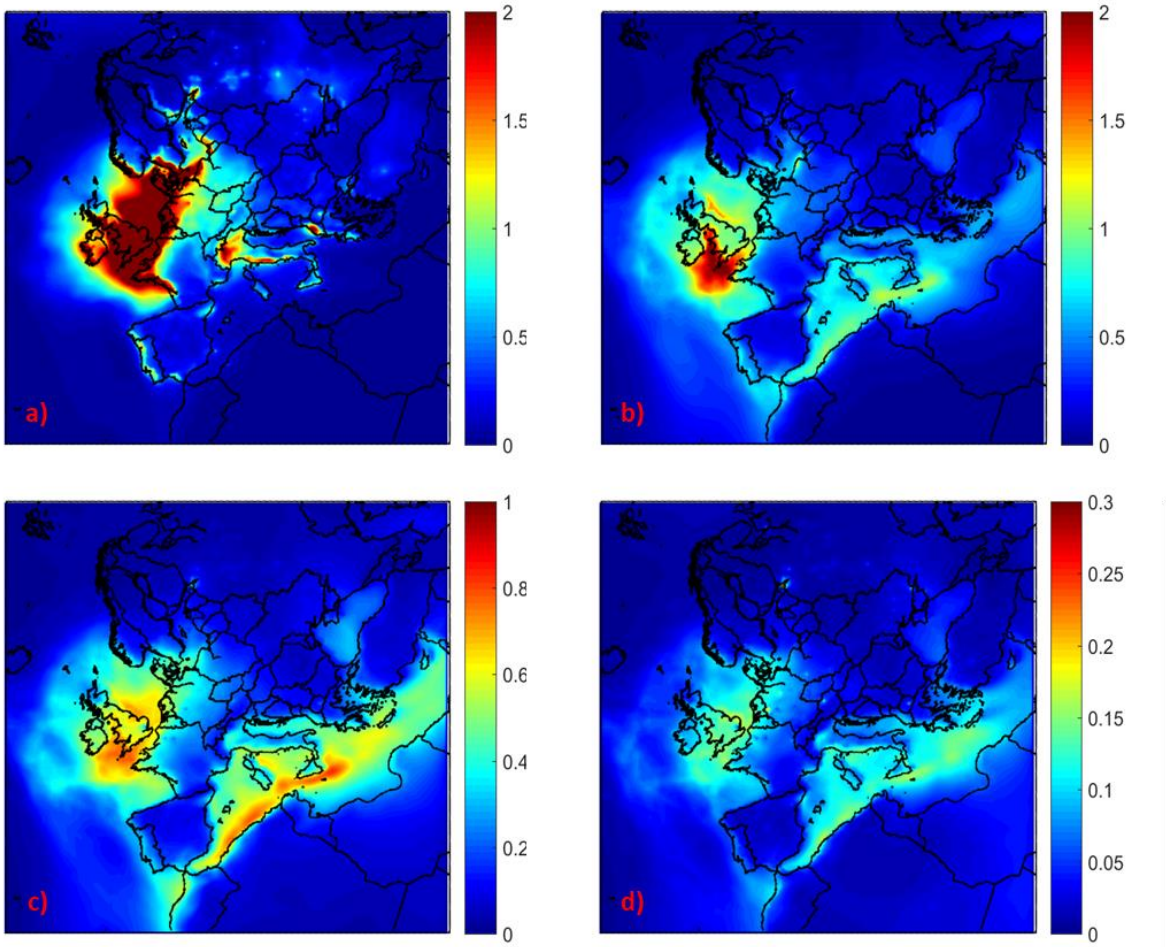

Figure S5. Average ground level aerosol nitrate predictions (in μg m^{-3}) for **a)** PM_1, **b)** $PM_{1\text{-}2.5}$, **c)** $PM_{2.5\text{-}5}$ and **d)** $PM_{5\text{-}10}$ for the base case simulation during May 2008. Different scales are used.

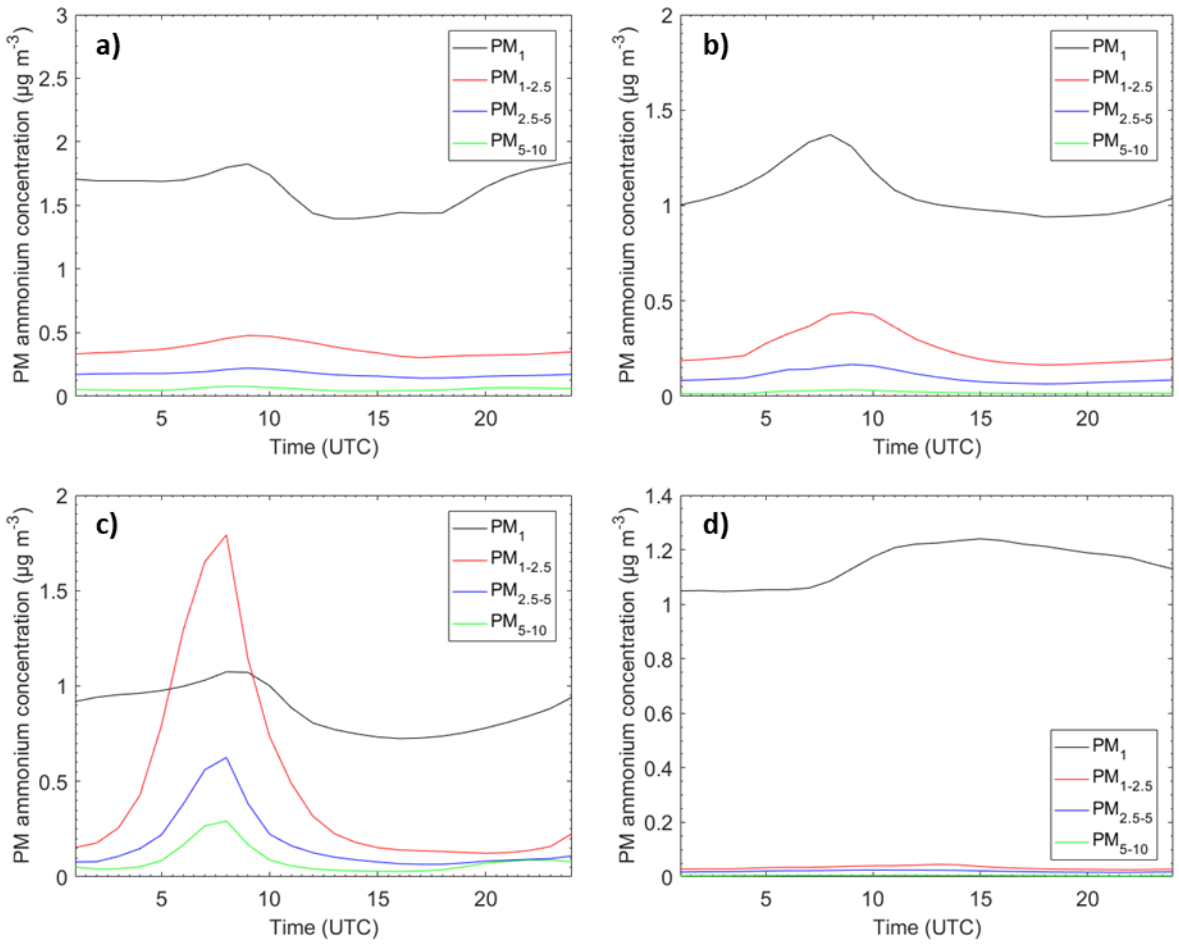

Figure S6. PM_1, $PM_{1\text{-}2.5}$, $PM_{2.5\text{-}5}$ and $PM_{5\text{-}10}$ ammonium diurnal profiles for **a)** Cabauw, Netherlands, **b)** Melpitz, Germany, **c)** Paris, France and **d)** Finokalia, Greece for the base case simulation during May 2008.

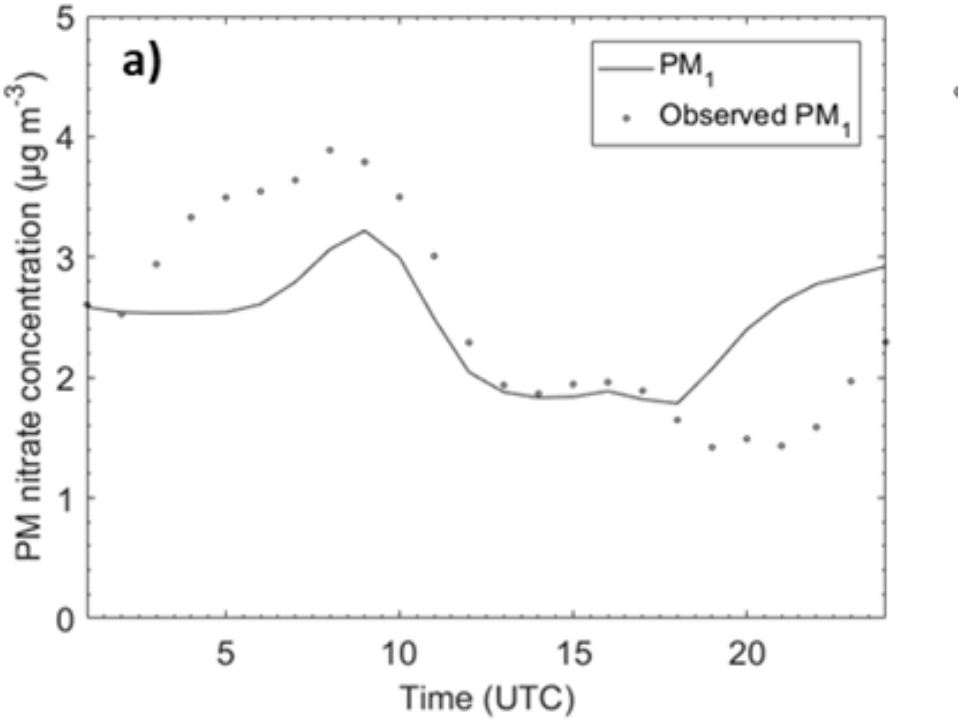

Figure S7. Predicted (solid line) and observed (dotted line) PM_1 nitrate average diurnal profile in Cabauw, Netherlands during May 2008.

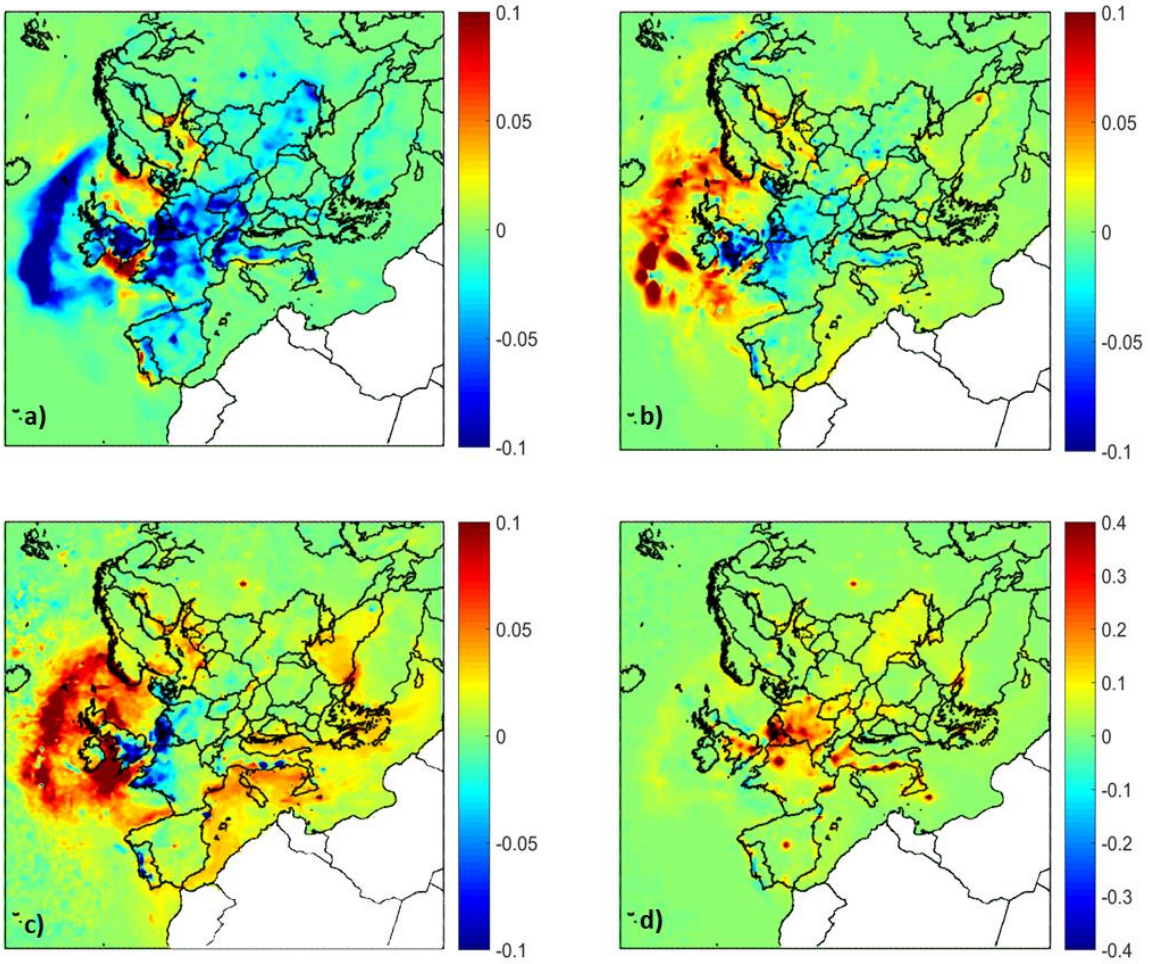

Figure S8. Change (base case minus inert dust case) in average ground level aerosol water (in μg m^{-3}) for **a)** PM_1, **b)** $PM_{1\text{-}2.5}$, **c)** $PM_{2.5\text{-}5}$ and **d)** $PM_{5\text{-}10}$ during May 2008. A positive value indicates that the dust components cause an increase in water and a negative corresponds to a decrease. Different scales are used.

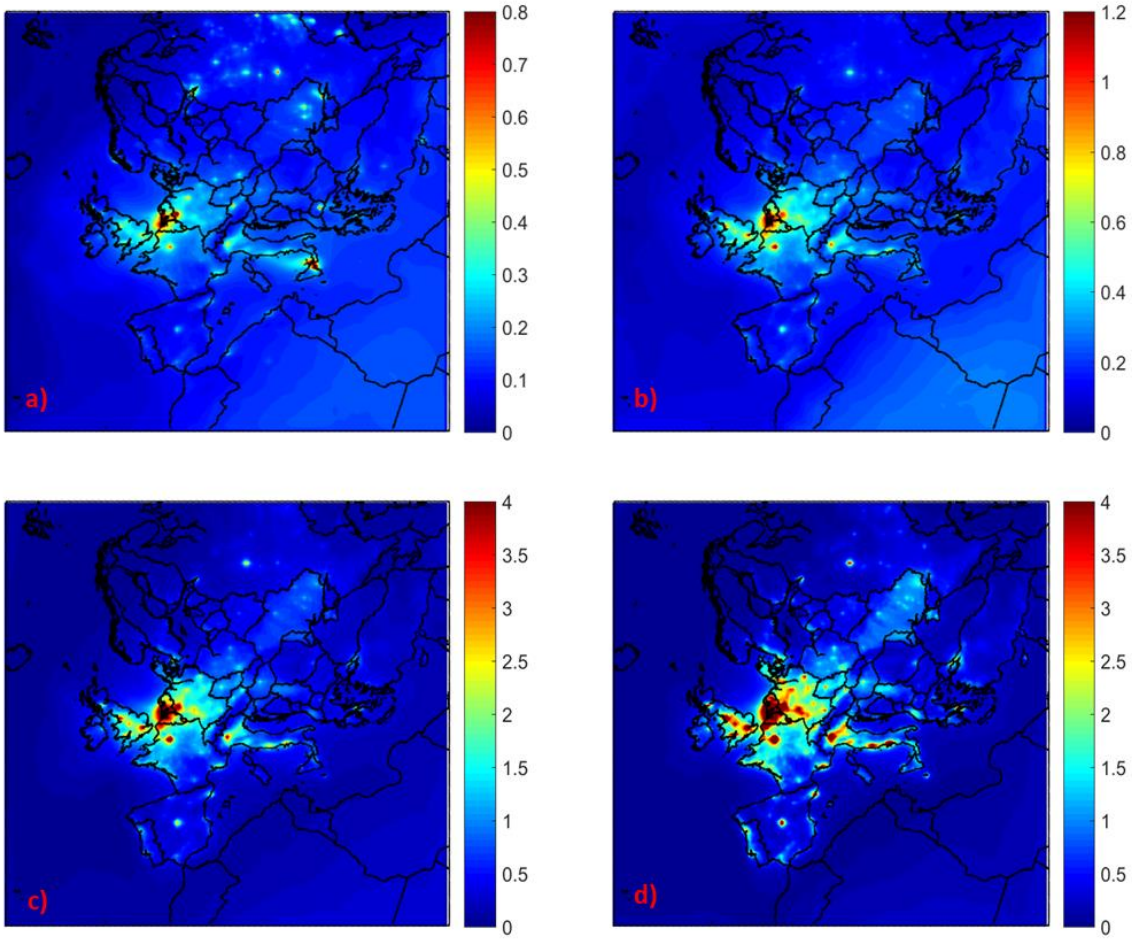

Figure S9. Average ground level aerosol dust predictions (in μg m^{-3}) for **a)** PM_1, **b)** $PM_{1\text{-}2.5}$, **c)** $PM_{2.5\text{-}5}$ and **d)** $PM_{5\text{-}10}$ for the base case simulation during May 2008.

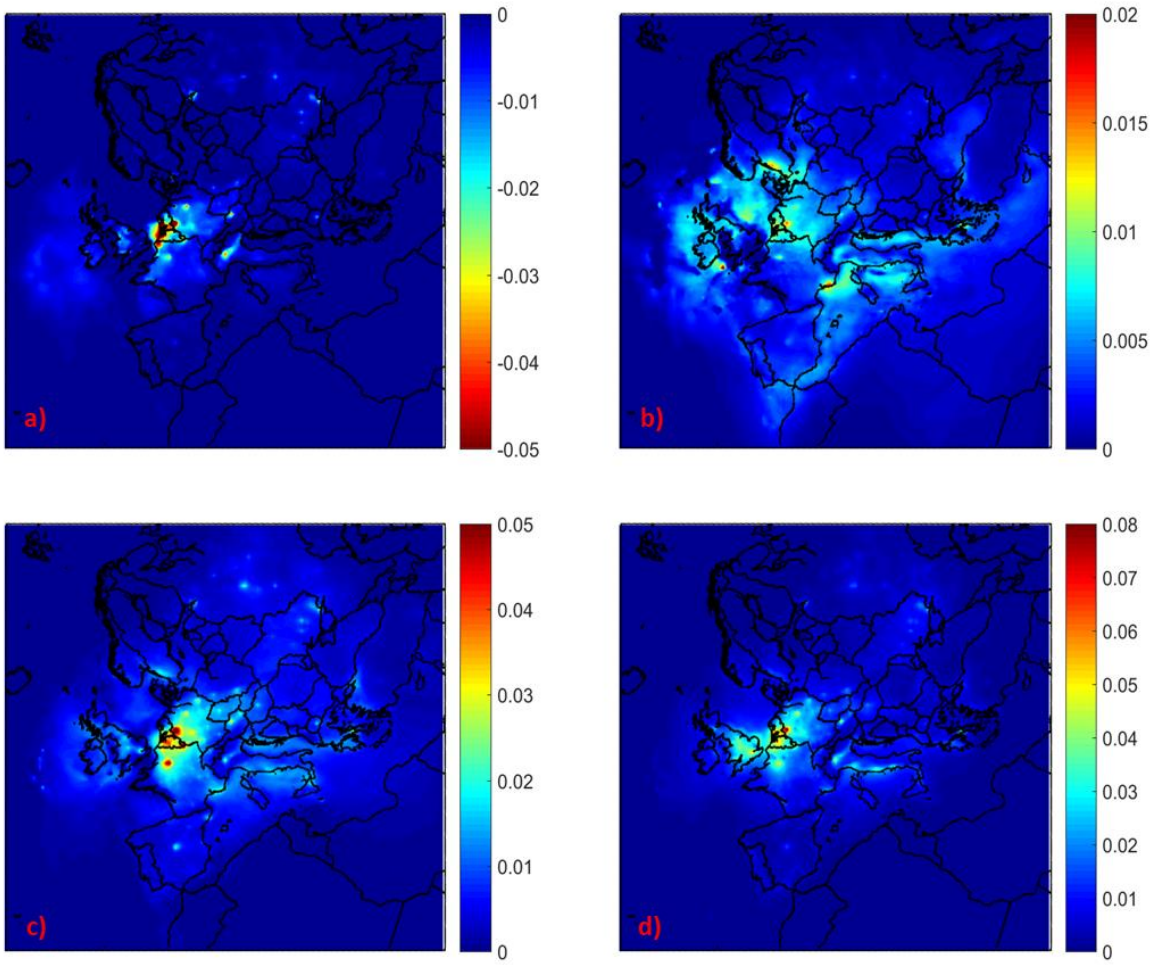

Figure S10. Change (base case minus inert dust case) in average ground level aerosol nitrate (in μg m^{-3}) for **a)** PM_1, **b)** $PM_{1\text{-}2.5}$, **c)** $PM_{2.5\text{-}5}$ and **d)** $PM_{5\text{-}10}$ during May 2008. A positive value indicates that the dust components cause an increase in nitrate and a negative corresponds to a decrease. Different scales are used.