

Interactive comment on “Nitric acid and particulate matter measurements at Athens, Greece, in connection with corrosion studies” by C. Tzanis et al.

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Authors response to the reviewers comments (by C. Tzanis et al.)

We would like to thank both referees for their valuable comments.
Below we respond to their comments:

Response to Referee #1:

We greatly appreciate his support to our findings and the interesting recommendations for future study. We fully agree with his comments and therefore we will take into

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account all of them in our future work on the field.

Response to Referee #2:

The authors would like to thank the anonymous reviewer for his/her insightful comments. We will take into consideration all comments of the reviewer in the final version of our paper. Our answers to the referee's comments are summarized as follows:

The purpose of the project was not to analyse the particle composition in Athens, but only to analyse those particles that have a high deposition velocity to surfaces and only to analyse the compounds that have a high risk for increasing the corrosion rate. A simple passive particle sampler was developed for this purpose. It was tested in Athens, Rome and London and has now been used all over Europe and at many sites in Asia. The deposition rates of particulate matter as well as other pollutants and climate parameters are being compared to measured corrosion rates at all sites. The particle depositions from individual sites have not been published, but the correlation equations between atmospheric parameters and corrosion rate for different materials. The study in Europe was repeated in 2005/2006 and is now being repeated again.

We know from other projects that urban aerosols contain a lot of insoluble matter such as oxides of silicon and aluminium. They can contribute to the soiling which we also measure, but not to the corrosion rate. Water soluble salts, however, are hygroscopic and form electrolytes that can increase the corrosion rate. This and previous studies have therefore focused on the water soluble fraction of the particles with high deposition rates.

We find a very low content of ammonium compared to other ions such as sodium and calcium all over Europe. The reason for this is that ammonium is only found in accumulation mode particles that have the lowest deposition rate of all modes. Sodium and especially calcium belong to the coarse mode which is more readily deposited near the source. The concentrations of water soluble ions in the air (moles per cubic metre) show the opposite pattern and ammonium dominates.

This is the first study of its kind where the vertical pattern of the particle deposition

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is measured. There are no similar studies to compare the data with yet. In the other studies measurements were only made at one site per city.

Please also note the Supplement to this comment.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 14683, 2009.

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