Comparison of three AMS measurements during the Hill Cap Cloud Thuringia 2010 (HCCT 2010) campaign

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Keywords: AMS, Aerosol cloud interaction, particle characterization, PM1.

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It is well established that clouds play an important role for the atmospheric chemistry. Inside a cloud, the chemical reactions pathways, which are much different from the ones provided by the gas phase chemistry, are leading to modified atmospheric aerosols after cloud dissipation as well as impacting the oxidative capacity of the atmosphere.

Impact of orographique clouds to the local aerosol chemical composition were measured during the Hill Cap Cloud Thuringia 2010 (HCCT-2010) field campaign which took place in autumn 2010 at the Schmücke Mountain in the Thuringia forest (Germany). Three sampling stations were equipped: a first one on the top of the Mt. Schmücke where clouds were sampled and two valley stations located upwind and downwind to the summit of the mountain. The main objectives of the HCCT-2010 project are to assess the effects of clouds on particle composition, gas phase oxidant budget, changes of hygroscopic properties and activation of aerosol particles.

In order to follow changes of aerosol chemical composition, a total of four Aerodyne ToF-AMSs were deployed during the campaign. One at each valley stations and two at the summit station; one connected downstream of a Cloud Virtual Impactor (CVI) for droplet residuals and one connected to an interstitial inlet measuring interstitial particles. The AMS measurements at both valley stations (Figure 1) were completed by PM_1 Particle-into-liquid sampler measurements (PILS, *Weber et al., 2001*) and at the upwind station by a PM_{10} Monitor for Aerosols and Gases in ambient Air (MARGA, Applikon Analytical, NL, *ten Brink et al., 2007*).

The three stations provided simultaneous measurements of the sized resolved aerosol chemical composition before, inside and after a cloud. Based on air mass trajectories, gas tracer experiments and meteorological parameters, it is possible to identify periods during which the air mass of the three stations were connected. According to this, the three AMS results will be compared in order to follow the cloud induced modification of the aerosol chemical compositions as well as modification of the chemical size distribution. Here we will present the first results of this project.

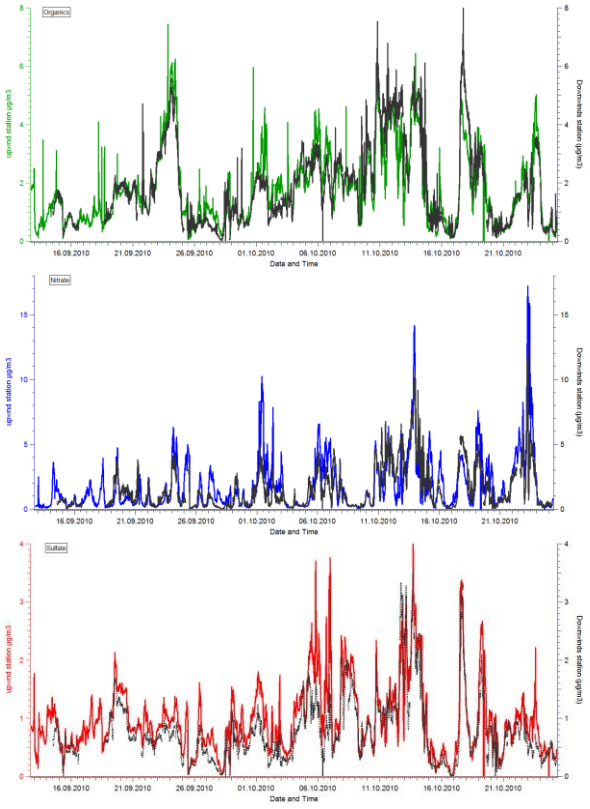

Figure 1: AMS time series measured at the upwind and downwind stations during the entire campaign.

References

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