Anonymous Referee #1 Received and published: 19 March 2012 MS No.: acp-2011-1017

The referee raises several important points that need to be better explained by us. We address them each in turn:

- In Abstract the authors promise a CFD modelling study, but nothing is given in the manuscript! It would be very helpful to see explanations how they determined the nucleation zone and what the loss of H2SO4 and H3/amine was between nucleation zone and detector.

We inadvertently left an inaccurate statement in the Abstract in readying the manuscript for publication. The CFD study was not ready at the time of submission, and to address the concerns in the referee short reports about relying too much on an unpublished study, we reduced substantially this reliance. This statement in the abstract was overlooked **and will be taken out.** Nonetheless, the CFD study has just been submitted and it should be available in a few months. Finally, we addressed the topic extensively in our response to referee #3's comments: to summarize, we use the Ball et al. nucleation zone determination and loss of H2SO4 was from the CFD and amine loss was a measured quantity.

What was the particle loss from nucleation zone to the counter depending on size?(0) What processes are important for particle growth, i.e. the role of NH3/amines for growth!(3)
- It's not clear to me, measured the authors the particle numbers in each case with the commercial TSI counters in the "enhanced mode" allowing detection of particles in the 1.3 - 2.5 nm range? (1) And were the particle in each case 2 nm in diameter or larger? (2) Can the authors clearly distinct between the base-effect for nucleation rate and/or for growth? (3)

(0) We did not discuss particle loss. Discussed will be added in the **Supplement section 5** that particle loss is small based on their size **(referral to Supplement will be added p1123, l15.)**
(1) Not every measurement was done 'twice'. Only a subset and the text and Supplement seem clear on this point. (2) Yes. The Supplement discusses this topic in some detail and a note to see Supplement will be made on **p1130 l 1**. (3) No, in fact we do not discuss whether growth rates were affected by N-bases.

- A comparison of slopes, log (nucleation rate) vs. log([H2SO4]), is presented. Have the authors any indication regarding the slope in the presence of amine as a result of their experiments? This topic should be discussed at least qualitatively.

We explored only one H2SO4 level when N-bases were present, Q_A = 0.4 sLpm. Any higher Q_A and there were too many particles; lower than this and diminished growth rates are a concern. We are planning experiments to address these issues. Note that we do quote a rough power dependency for varying [N-base].

- A comparison of author's findings with atmospheric observations for the "slope" and the nucleation rate and a discussion regarding this would be fine, for instance with the results by Kuang et al., J.Geophys.Res., 2008.

We are going to add a **section 4.4** with a short discussion on this point.

- Very recently (after submission of this manuscript) a paper by S.-H. Lee's group appeared in GRL with the same topic. The authors should refer to this paper and discuss the enhancement factors given here for much higher amine concentrations.

This **reference will be added** to main body of the paper and it will be discussed in section 3.1 and/or 5 as well as with the other N-base experiment results in the Supplement section 8.