

Interactive comment on “Conceptual study on nucleation burst evolution in the convective boundary layer – Part I: Modelling approach” by O. Hellmuth

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Conceptual study on nucleation burst evolution in the convective boundary layer - Part 1: Modelling approach

First I want to congratulate the author to these comprehensive publications, which will serve in the future as an excellent reference work in modelling new particle formation in the turbulent mixed layer. This subject and especially the review of publications in this area is a huge challenge. During the introduction in paper I the author gives an up today overview about past and on going research in this field. Further I want to mention

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the substantial set of equations in the appendixes and apologize that similar to referee 1 I was not able to go through all parts in detail. However, this part is written in a clear laid out way and I'm sure it will be used in the future by many modellers.

The English is excellent and all papers are structured clear and easy to follow. In all four papers the author always compares his results with published achievements. For this reason I recommend the publication of these papers after minor revisions.

Comments to Paper I: Page 11418, line 23: In this sentence the author mentioned a publication by Birmili and Wiedensohler and one by Stanier et al.. They found that SO₂ concentration is fairly correlated with NPF and this indicates that sulfuric acid is a component of new particles. I agree with the author that sulfuric acid is involved in NPF formation, however until now we are not sure in which role and up to what extend H₂SO₄ is acting. It would be good in this context to mention in the manuscript that there are other studies for example in the boreal forest where a anti-correlation of SO₂ and NPF for a 2 years study were investigated (Boy et al., 2003c).

Page 11424, line 9: At the end of this sentence the author said ' binary nucleation theory, the detailed chemistry of the events remains uncertain' I did not get clear the reason for this last part at this place. Before the author explains the status of binary nucleation and just includes this sentence - which is completely correct is this statement - without further discussion. I recommend to delay this part or include some more explanation about this important statement at this place of the manuscript.

Page 11423, chapter 3.2.4: In this chapter the author gives an overview about different nucleation theories and their applications in atmospheric modelling. I missed some interesting contributions concerning ion-induced nucleation (Lovejoy et al, 2004 and others) and believe it would be a valuable part in this chapter.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 11413, 2005.

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