

## ***Interactive comment on “Evaluation of aerosol number concentrations in NorESM with improved nucleation parameterisation” by R. Makkonen et al.***

### **Anonymous Referee #2**

Received and published: 1 January 2014

The manuscript by Makkonen et al. submitted to ACP is a very useful contribution in its field. It presents a new version of the NorESM including an improved aerosol nucleation parameterization, and an impressive evaluation against a wide range of aerosol measurements. The manuscript proceeds in a logical and clear order, the steps taken are mostly well justified, the literature is well cited, and the language is very good. My recommendation is thus to accept the manuscript for publication with only some minor and technical remarks, as follows.

- Intro: the word “demanding” is used too many times, please rephrase.

C10571

- Intro: please motivate and highlight why the target of the paper was set to study the relative roles of the two processes on the number concentrations (last para of Intro).

- 2.1: Some acronyms (such as NCAR and CPL-7 here, and DMS later) are undefined.

- 2.1: HAMOCC is not referenced and not explained. NorESM climate response could be very shortly summarized, esp. if it helps to understand simulation deficiencies later.

- 2.2: “lump together” is not good language. Please rephrase (used also later in the text).

- 2.4.3: Please open up and reference “CLOUD”

- 3.1: Motivate why ECLIPSE is not used here.

- 3.3, 2nd sentence: something is missing here, please correct.

- 3.4: the simulation acronyms are rather cryptic and difficult to follow. If possible, try to improve and explain better in a separate Table (as attempted already).

- 5.2: The text and Figures are not synchronized. Please correct, for instance, by changing the order of appearance of the Figures.

- 5.2 – 5.5: The validation against different types of observations is very good. Yet, I'd suggest adding a short summary to each sub-chapter to help reader to find the essential result before going into the details.

- Conclusions, 4th para: the word “meteorology” is used a number of times in a slightly odd meaning. Please replace by something more appropriate, such as “atmospheric circulation”, or “atmospheric state”.

- Figure 3. The blue dots are very hard to see, please improve.

- Figure 12. Try to include the legends for different lines.

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 26389, 2013.

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