

***Interactive comment on “Explaining global surface aerosol number concentrations in terms of primary emissions and particle formation” by D. V. Spracklen et al.***

**Anonymous Referee #2**

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First of all, I apologize for taking so long with the review.

This MS is an important study combining data from field observations at various environments to evaluate the performance of the GLOMAP model, and further discuss the importance of new particle formation in the boundary layer as a source of atmospheric aerosol number concentrations. The manuscript is well written and concise, and well suited for publication in ACP. I have only a couple of minor points that I would like the authors to address:

1) Now the comparisons are made between measured and modeled total "CN" concentrations, without further information on the particle size distributions - although it is well

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known that the size distribution has a major effect on e.g. the climatic implications of the results. The authors state, however, that for many of the studied sites size distribution data was available. It would be nice if the authors could discuss a little the potential agreement/disagreement between the modeled and measured size distributions.

2) It would also be nice if the authors could give the instrument that the CN data from each studied station is based on as well as the measured size range (maybe in Table 2).

3) Although the agreement between the measured and modeled data is generally pretty good, it is not perfect (I assume particularly if the size distribution would be concerned). It would thus be good if the authors could elaborate a little on what are the next important steps in developing the aerosol representations in global models.

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