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***Interactive comment on* “Characterization of satellite based proxies for estimating nucleation mode particles over South Africa” by A.-M. Sundström et al.**

Anonymous Referee #1

Received and published: 9 December 2014

Review of the manuscript "Characterization of satellite based proxies for estimating nucleation mode particles over South Africa" written by Sundström and 17 co-authors.

The authors apply a very interesting methodology which was originally introduced by Kulmala et al. (2011). The goal is to estimate nucleation mode particles over South Africa by using proxies which are constructed with geophysical parameters derived from satellite data. I very much support the development and reporting of such type of studies. It is a real challenge to gain information about processes related to new particle formation derived from satellite measurements and relate it to ground based measurements. Also, to use a combination of sensors onboard A-Train constellation

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as data source is an adequate input and forward-looking for such purposes. Generally, the use of synergistic observation in combination with in-situ data enable to launch excellent science.

However, the work presented here obviously discloses the inadequateness of the currently suggested proxies for describing the processes in focus. The results should be carefully and critically explored, which has not been done. A creative analysis of other proxies which could substantially influence the results is missing. Although the region of interest was changed and in addition the formulation of proxies was slightly changed it is clearly shown that results don't improve significantly.

When reading the current manuscript it seems that the authors would like to introduce these results as an improvement as compared to the earlier article by Kulmala et al. (2011) (which I believe is not intended at all by the authors). The results presented here demand further discussion if it is possible to derive the envisaged goal from using these proxies and most importantly how results can be refined. In my opinion the presented approach is in the early development stage and definitely requires further treatment.

Furthermore, I would recommend to include more critical and constructive aspects in the overall discussion, e.g. to consider additional properties.

I would like to encourage the authors to rewrite the manuscript to do justice to the complexity of the given research topic.

In summary, I cannot recommend the manuscript in its present form for publication in ACP.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 25825, 2014.

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