

The authors thank the referee for the constructive comments. Our replies to the comments and our actions taken to revise the paper (in blue) are given below (the original comments are copied here in *Italic*).

Anonymous Referee #1

This paper analyses atmospheric new particle formation and growth in North America by comparing model simulations with measurements made at 9 locations. The topic of the paper is of scientific interest, and the analysis itself appears scientifically sound. The paper is relatively well written and structured and it is easy to follow.

We appreciate the reviewer's positive comments about the manuscript.

I have only one major comment that I would like the authors to address somehow:

While the authors discuss the implication of their findings, and also related uncertainties, in section 4, this whole discussion remains at a rather speculative level. I would strongly recommend the authors to perform at least some sensitive runs to the key variables that are expected to influence the obtained results. Such a sensitivity study would considerably raise the value of this analysis.

The main focus of this study is to investigate the potential role of oxidation products of biogenic VOCs in NPF in the real atmosphere, through comparisons of model simulations (with and without including organics in the nucleation rate calculation) against NPF events and non-events observed over nine forest areas in North America (NA). In section 4, the possible reasons behind the significant overprediction of NPF events and particle number concentrations in summer by the Nucl-Org scheme are discussed. The possible reasons include the lack of temperature dependence in the Nucl-org scheme and uncertainties in the concentrations of low volatile organics involved in the nucleation. We agree with the reviewer that some sensitive runs to the key variables will be useful. However, currently we do not have a physically sound or meaningful approach to take into account the temperature dependence of Nucl-Org rate and the uncertainty in BioOxOrg concentrations. A simple scaling of the pre-factor (k_m) and [BioOxOrg] in Equ. (1) will not be very useful. As we have emphasized in the paper, the uncertainties in k_m and [BioOxOrg] are unlikely to explain the observed spring-summer contrast in NPF since the concentrations of these specific compounds (i.e., BioOXOrg) are much higher in the summer, but observations show more frequent and stronger NPF events in the spring. We do think that the temperature dependence of Nucl-Org rate could be the key but again we currently do not have a suitable parameterization to take into account this temperature dependence. This will be the subject of future research.

The only technical error I could find was the error in citation (line 26 on page 21278): the year of publication should be 2003.

Corrected. Thanks.