

Interactive comment on “Biogenic emissions and land-atmosphere interactions as drivers of the diurnal evolution of secondary organic aerosol in the southeastern US” by Juhi Nagori et al.

Anonymous Referee #2

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The authors use existing parameterisations to update a coupled land-atmosphere model to represent biogenic secondary organic aerosol (SOA) formation at a site in the southeast US. The paper is clearly written and the figures and tables are well presented. The topic is also appropriate for ACP, but the justification for the study is weak.

The authors use mechanisms and processes that have already been applied to regional and global chemistry transport models (CTMs) (Pye et al., 2010, 2013; Marais et al., 2016) and used to describe the processes that contribute to biogenic SOA formation. It's not apparent why a land model is needed to improve the SOA simulation or that conclusions from this study couldn't be derived without the land model. There is

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also no evidence or reference to past studies to support the need for the land model. What happens to the simulations when input from the land model is prescribed rather than modelled explicitly?

The model that the authors use also only simulates atmospheric composition for a limited time period during the day. It's not clear why this is the case and what effect this has on simulation of biogenic SOA. The output from the model also gives the impression that there is something faulty with the model, especially in Figure 5 (b) where it appears simulated isoprene mixing ratios would continue to increase beyond 3pm (when the last output is obtained from the model) and so far exceed the measurements.

There are also inappropriate references provided to indicate the source of parameterizations and variables for the biogenic SOA formation mechanisms. For example, the authors quote Hu et al. (2016) numerous times (P2 L17, P2 L19, and throughout Section 3.2, but the variables and parameterisations are not original to that study.

References:

Marais et al., doi:10.5194/acp-16-1603-2016, 2016. Pye et al., doi:10.5194/acp-10-11261-2010, 2010. Pye et al., doi:10.1021/es402106h, 2013.

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