Geoscientific
Model Development
Discussions

Interactive comment on "The effect of satellite derived leaf area index and roughness length information on modelled reactive nitrogen deposition in north-western Europe" *by* Shelley C. van der Graaf et al.

Anonymous Referee #2

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The work presented in this manuscript describes the results on nitrogen deposition fluxes from integrating spatially and temporally explicit values for z0 and LAI calculated from satellite-derived measurements. The paper reads really well, the description of the work done is very comprehensive and the figures informative.

It is regrettable that no prior sensitivity analyses of the model to LAI and z0 values was performed to determine whether implementing new parameterisations would expect to improve reactive N outputs (concentrations and fluxes). The authors reach this conclusion at the end of the study. I also find it a little ambiguous in grasping what is novel

in this paper. Clearly using satellite data for parametrising a CTM is but this does not improve drastically N deposition estimates. Perhaps a way around this is presenting this "new" methodology as a way to improve various exchange processes and argue that an example treated in this paper is the case of reactive N.

I have a few minor comments:

- Authors should better justify why they have chosen to take the average function of several different z0 functions for their models (Figure 1). Some pf those functions have similar trends and could be pooled together and averaged however others are different and a justification is needed.

- Authors should probably discuss or argument at the beginning the upside of using satellite derived data as compared to using outputs of biosphere models o from coupling LOTOS-EUROS with a biosphere model

- Better discussion is needed on the uncertainty related to reactive N deposition fluxes linked to (i) model parameterisation (Rcuticular, Rstomatal, gamma, . . .) but also sub-grid variability.

- A deeper discussion of the validity of assumptions (canopy height for forests, urban height, etc) and results of z0 and LAI compared to literature values, other models simulations but also to site scale measurements from networks (fluxnet, ICOS, . . .).

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-256, 2019.