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Interactive comment on "Estimation of pre-industrial nitrous oxide emissions from the land biosphere" *by* Rongting Xu et al.

Anonymous Referee #2

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This is an interesting study that reports the pre-industrial nitrous oxide emissions from the land biosphere. The authors used a process-based ecosystem model, DLEM, to simulate the N2O emission based on assumed previous-industrial conditions of climate, vegetation cover etc. Several comments might be helpful for the authors to further improve the manuscript.

The country-level analysis does not make much sense as a large amount of countries had different boundaries compared to present. In line 396, those country-level emissions might need to be removed.

I am little curious to see the small uncertainties in continent-level N2O show in Figure 5 as the LHS was used and the large uncertainties were shown in below panel in Figure 5.

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Discussion paper

The model implementation is not clear. I assume this study is based on a steady state or semi-steady state simulation. The equilibrium run was for 1860, followed by a spinup. The transient run was driven with climate data in 1860 (line 153). What is the data source? If the equilibrium run was based on 1860 data (most). Then, there are small discrepancies among spinup and transient runs. A comparison between equilibrium and transient run might be needed. If there are no big differences, using equilibrium run might be more convincing, as most driving forces were 1860 except climate data of 1901-1930. If the authors really want to have a transient run, the model simulations should start even further to capture the legacy impacts of natural and anthropogenic impacts, particularly the land use change.

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