

Interactive comment on “Nitrous oxide emissions from soil of an African rain forest in Ghana” by S. Castaldi et al.

Anonymous Referee #2

Received and published: 10 April 2013

This paper reports N₂O emission fluxes from an African tropical rain forest. The long-term measurements (19 months) with relatively high sampling frequency (six days per month) conducted by this study could greatly reduce the uncertainty of the annual N₂O emission budget from the forest, and hence the data reported by the paper are valuable. However, the method used for N₂O as well as CO₂ measurements in the study may have defects. Several authors (Zhang et al., *Journal of Environmental Sciences*, 2013, 25(3): 547-553; Zheng et al., *Plant and Soil*, 2008, 311(1-2): 211-234) recently have recognized strong influence of CO₂ concentration on N₂O measurements by using high purity N₂ as carrier gas for the GC-ECD method, and N₂O flux would greatly overestimated by using the static chamber in comparison with high precision methods (DN-CO₂ method, DN-Ascarite method and AM method). Therefore, the reviewer suggests the authors to discuss a little bit about the quality of the data referring to the

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two references. The English through the whole manuscript should be improved before publishing.

Specifics: 1. Abstract, line 1, the sentence is better replaced by “Most recently atmospheric studies have evidenced large N₂O sources from tropical/subtropical lands”; Line 3-5, the two sentences are better combined together, e.g. The uncertainty related to both sources is very high, due to the paucity of data and small frequency of sampling in tropical studies, especially for the African continent; Line 19-21, the conclusion lack of evidence, because the authors didn't provide comparison with other fields. 2. Results, the very large negative values of N₂O fluxes obtained by the study may be due to the large uncertainty of the method used by the authors; Considering the standard deviation of the GC-ECD for measuring N₂O, the small fluxes (less than 0.103mg/m³/d derived from their standard deviation) presented in line 15-16 (page 16571) were meaningless; Page 16571, line 23-24, I don't know the meaning of the sentence. 3. Discussion, page 16574, line 1-3, I don't think that the comparable annual N₂O fluxes in the three African sites mean similar key driving mechanisms of N₂O production; Page 16575, line 10-13, are you sure the WFPS (37-78%) in the lowland is close to saturation? The WFPS values for most soils favor for nitrification and denitrification, and hence for N₂O emission.

Interactive comment on Biogeosciences Discuss., 9, 16565, 2012.