We would like to thank the reviewer for his/her useful comments and constructive criticism. Some of the raised concerns coincided with the other reviewer, and might have been developed in more detailed there. For this reason, we would kindly like to request him/her to double check our responses in both documents.

The authors describe a novel spatially comparable dataset containing annual means of gross Agriculture Forestry and Other Land Use emissions, an important contributor (one fifth in 2010) to the total global emissions. They identify a breakdown of the most important sources of CO2-e in the different part of the world; deforestation in Central/South America, forest/savanna fires in Africa and peatland/agriculture/rice emissions in Asia.

Comment 1"They also claim that although agriculture and forestry roughly have the same mitigation potentials, but their economic feasibilities differ, with the forestry sector being much more cost effective than agriculture, which is an important outcome. However, mitigation strategies in agriculture could be interesting for other reasons than mitigation of emissions (stopping/reversal of degradation, improvement of soils for soil organic carbon leading to more efficient water use and higher yields) ". Yes, true. We have improved paragraph 330-350, but would rather focus on climate change mitigation arguments, to avoid complicating the discussion.

Comment 2 "The paper addresses uncertainties, and tries to identify hotspot regions for the best abatement possibilities. However, this is derived from various guestimates, which makes the end result a bit less robust in my opinion (page 7, line 174 'authors expert opinion', page7 line 189 'known poor performance of the DAYCENT model over organic soils', page 8, line 209 ; authors export judgement', page 8, line 221 'expert judgment'., suppl. material also. In this way, many educated guesses are introduced and it is not clear to the reader on what ground these estimates were based, and more important, how this might influence the end result. However, I do realize that at this moment this is probably the best spatially explicit effort available and the paper therefore has its own merits". We agree with the reviewer that several approaches in this research make the final results on uncertainties less robust (e.g. expert judgement for the uncertainties of two emission sources), but even the models that estimate emissions uncertainties are full of assumptions, so having the real spatial uncertainties for our two missing datasets would be desirable, but it would not necessarily guarantee higher robustness. We have tried to be as transparent as possible in this manuscript, so that the reader can weight how trustable they find the results. For us, even more problematic than these guestimates are the assumptions behind uncertainty aggregation when scaling up. Thus, assumptions regarding data correlation (data complete dependence versus complete independence) have an impact of orders of magnitude on the final aggregated uncertainties. We are currently working on a paper on this topic, since it impacts the prioritization of mitigation regions and emission sources.

Comment 3 "*I agree that an effort such as this could contribute in potential to 'improve our understanding of where and how much countries could enhance their AFOLU ambition from what currently is reported', but there should remain a strong focus on decreasing the uncertainties in all methods applied.* Although we do recognize the importance of contrasting NDCs to external independent emissions datasets, we do not necessarily imply that our data are too well fitted for this particularly purpose. Thus, countries report their INDCs based on net emissions while we report gross emissions. For those countries reporting sectorial targets, our emissions might help double check areas with large divergences between their intended targets and their historic gross emissions. In any case, our research should include a temporal component and move towards net emissions and decreased uncertainties, to be a more useful tool for that purpose.

Comment 4 "*Perhaps a similar effort such as, or in cooperation with, the Global Carbon Project (GCP) should be established, in order to try to provide regular updates/improvements of this dataset. Also a direct comparison of the CO2 component with the GCP would enhance the credibility of this study*".
The idea sounds appealing, and we are opened to cooperation. However, we believe that at this stage we are not producing similar data, and the comparison of CO2 emissions with the GCP would prove difficult since our emissions are gross and tropical, while the GCP offers net and global.

Comment 5 *"One questions remains whether this methodology could also be applied to the rest of the world to get a full global picture? If so, why didn't the authors do so? "* The methodology can be applied to larger areas and multiple time periods, the problem is data. All the emission sources used in this research have global coverage except deforestation. This is the reason why we restricted to their study area (tropics and subtropics). So far, there are no global datasets on deforestation emissions out of the tropics. Hansen et al. (2013) have estimated deforested areas, but emissions are not yet available, although they are being produced. Temporal estimates would also be important, but datasets such as livestock only

offered emissions for 2000. This research is a multi-step process. We hope to move towards net emissions, global and multitemporal.

Technical Remarks

Page 2, line 52; the claim 'we offer a spatially detailed benchmark' gives the impression that spatial is always better than non-spatial? Seems a bit strong statement to me. We believe that the comparative advantage of this research is its spatially explicit nature, and the transparency of its methods and assumptions. It allows countries to check for subnational and regional emissions and detect which emission sources (eg. Deforestation, degradation, livestock, cropland soils, paddy rice) are behind the highest emission trends in which areas. Spatially explicit emissions offer a lot of interesting insights that non spatial results don't (e.g. interaction with climate, with socio-economic variables, etc)

Page 3, line 74, 75: The authors claim that reporting on a country scale is not adequate for implementation of mitigation measures. Why is that? National scale statistics on AFOLU emissions offer an aggregated view of a country's emissions that does not allow countries to identify which regions within their country need priority action, and which emission sources within each region are more important. Implementation benefits from more detailed spatial scales that allow untangling the sources and start checking the drivers, so that policies and measures can be effectively applied on the ground (e.g. how could a country with large deforestation emissions develop new policies and put mitigation action in place to stop deforestation if the regions where deforestation occur are unknown?)

Page 13, line 367 (Balch et al under review). In the reference list it says ' in press'. Many thanks. It is under review. Changed

Page 21, reference Le Querre et al is not correct, should be: Le Quéré, C., Peters, G.P., Andres, R. J., Andrew, R. M., Boden, T. A., Ciais, P., Friedlingstein, P., Houghton, R.A., Marland, G., Moriarty, R., Sitch, S., Tans, P., Arneth, A., Arvanitis, A., Bakker, D. C.E., Bopp, L., Canadell, J. G., Chini, L. P., Doney, S. C., Harper, A., Harris, I., House, J.I., Jain, A. K., Jones, S. D., Kato, E., Keeling, R. F., Klein Goldewijk, K., Körtzinger, A.,Koven, C., Lefèvre, N., Maignan, F., Omar, A., Ono, T., Park, G.-H., Pfeil, B., Poulter, B., Raupach, M. R., Regnier, P., Rödenbeck, C., Saito, S., Schwinger, J., Segschneider,J., Stocker, B. D., Takahashi, T., Tilbrook, B., van Heuven, S., Viovy, N., Wanninkhof,R., Wiltshire, A., and Zaehle, S. (2014) Global carbon budget 2013, Earth Syst. Sci.Data, 6(1): 235-263, doi:10.5194/essd-6-235-2014. Many thanks. Changed.

Figure 2b depicts the uncertainties in AFOLU emissions and (coincidence or not) the regions with the highest emissions have also the highest uncertainty. What does this mean for the overall conclusion and robustness about the authors claim that this spatial explicit approach is better than the country level estimates from FAOSTAT en EDGAR, since the uncertainties are so high?

I do like figure 3, although the dark coloring makes it hard to distinguish details (and where is the dark color in the legend?) We tried several visualizations including white and greys, and black offered the best contrast. We have included the description of black in the legend caption, since the reviewer is right that not all readers are used to RGB visualizations.

Figure 2 and 4. The figure has a somewhat strange classification, based on what? The lowest values in blue are hard to distinguish. Perhaps introduce a separate category 0 (zero) with a different coloring (grey for example). Yes, we agree with the reviewer that several options could exist, depending what was the message we wanted to send to the reviewers. We have been trying several things all along, and these figures have gone through a lot of discussion! Thus, the story behind these two graphics is that we had to choose between 1. reinforcing the colouring of those areas with larger emissions for each gas independently (CO2, N2O and CH4, and the aggregated CO2e), or 2. choose a legend that allowed a comparative visualization of the emissions for the different gases. The first option would have immediately shown regions where the different gases were higher, but then their legends would not have been comparable (I personally preferred this option, since CH4 and N2O are not too visible now). Coauthors, however, agreed that a comparative visualization of the different gases was better. This is the reason for the strange legend categories (they represent the natural break points for the gas that has lowest emissions, N2O). We believe, however, that the readers do not need to learn from these details, so we have omitted explanations on this point.

Figure 5. Do I interpret it correctly that India as a whole and Indonesia are hotspots for emissions, but India has also a low uncertainty in the estimate of those emissions and Indonesia is therefore much more uncertain ?Correct! More contextual information on this figure has been added in lines 330-350.