Interactive comment on "EDGAR v4.3.2 Global Atlas of the three major Greenhouse Gas Emissions for the period 1970–2012" *by* Greet Janssens-Maenhout et al.

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The authors thank the reviewer for the detailed review and the very valuable comments, to which we agree.

Specific comments:

Comment on Abstract: We agree that "best-available" emission factor is misleading and can be omitted. The emission factors in the EDGAR database are a compromise between what is available and what can be best selected as reasonable value valid for a large group of countries.

Comments on Introduction: p.4, line 2: The commentary is removed. p.4., line 16: The subsentence "as a consequence uncertainties in particular in the inventories of Annex I countries can be assumed to have declined" is removed. (The authors can only refer to the reported uncertainties of the inventories of some Annex I countries (e.g. Germany, Finland), for which a reduction was observed.) p.4, line 27: The sentence on the 2023 stock take has been moved to the outlook section, as suggested by the reviewer. p.5, lines 4-10: the paragraph has been shortened (halved in length), as suggested by the reviewer.

Comments on Methods p.5, lines 29-30: the sentences have been shortened, as suggested by the reviewer. p.6, line 16: The word "also" has been replaced by "mainly". The authors agree that the carbon content of the coal plays only a minor role for the CH4 coal mine gas. p.9, line 13: "seems to flood" has been replaced by "are normally flooded". The authors do not have a specific reference for these smaller mines in China, but when a mine is decommissioned, the dewatering system is switched off and the mine starts flooding, depending on the underground structure (Wolkersdörfer, 2008). Many smaller mines in China were in 2005 closed for safety reasons and flooded (including also flooding disaster in Jiangjiawan Mine). The Chinese government is very well aware of the necessity to this, because it faces the most serious underground coal fires on earth (Voigt, S., et al.) ref: Wolkersdörfer, C. (2008) Water Management at Abandoned Flooded Underground Mines – Fundamentals, Tracer Tests, Modelling, Water Treatment, Springer Verlag, 465 pp., 2008 Voigt, S., Tetzlaff, A., Zhang, J., Mehl, H., (2004) Integrating satellite remote sensing techniques for detection and analysis of uncontrolled coal seam fires in North China, Int. j. coal geology, 59 (1-2-2017), DOI: 10.1016/j.coal.2003.12.013, 2004. p.9, lines 15-16: The authors agree that both the absolute emissions and the relative to the country's total emissions for this sector are important. The absolute numbers of tons CH4 recovered have been added, as requested. p.15, line 33: The authors agree that this section needs to be worked out, but consider this for a separate paper and preferred to remove the paragraph.
Comments on Resulting trends The authors tend to believe that the overview in CO2eq is useful, as it shows the relative importance of the different gases, but the authors agree that 3 additional figures, S4.a for CO2, S4.b for CH4 and S4.c for N2O are useful. Seen the length of the paper, these three additional figures were prepared for the Supplementary. Moreover, the authors would like to refer to the online EDGAR booklet with the data for each of the countries displayed and added the reference and link. p.21, line 6: Conform IPCC, the EDGAR database category of non-metallic minerals (NMM) comprises the production of cement, of lime, soda ash, glass and bricks as well as the use of limestone and dolomite, the use of glass and soda ash and other uses of carbonate. The comparison in Fig.6a is done for the total sector of non-metallic minerals, of which cement production is the largest contribution. The figure aims to illustrate: (1) the increasing difference in estimates for the cement sector amongst literature, mainly due to the clinker fraction that is changing over time; (2) the importance of completing the total sector, which is e.g. lacking in the GCP dataset of Le Quéré (2013). p.21, lines 24-26: The authors agree that datasets need to be clearly documented to understand better comparisons, such as between EDGARv4.3.2 and the Liu et al. (2015) study. Firstly, the authors wanted to indicate that the 14% difference reported in the study of Liu is only a 6% difference if the same sectors and subsectors are compared. EDGAR includes also other sectors for completeness, which are not taken up in Liu's study. Leaving out these additional sectors of EDGAR, only a 6% difference remains between the study of Liu and the EDGARv4.3.2 estimate. This 6% difference allows both estimates to be within the uncertainty band of 9% in 2012 around an estimated/reported CO2 total for China. Secondly, the authors wanted to explain where such discrepancies/ differences come from. These are originating from different assumptions, such as on the non-oxidation factor. The authors rephrased the paragraph to avoid mixing of real uncertainties and chosen assumptions. p. 22, lines 28-29: The authors agree that a rephrasing is needed to avoid too high expectations of past global inverse modeling studies, without excluding such expectations for the future (as shown by Henne et al., 2016). ref: Henne, S., Brunner, D., Oney, B., Leuenberger,

M., Eugster, W., Bamberger, I., Meinhardt, F., Steinbacher, M., and Emmenegger, L.: Validation of the Swiss methane emission inventory by atmospheric observations and inverse modelling, Atmos. Chem. Phys., 16, 3683-3710, https://doi.org/10.5194/acp-16-3683-2016, 2016.

Resulting grid maps p.23, lines 18-28: The first paragraph has been removed. p.27, lines 3-13: The authors agree that the current verification capacity of the modeling community using atmospheric measurements remains limited as the models also struggle with accuracy of natural emissions which need to be subtracted from the total emissions to determine the anthropogenic part. A sentence has been added accordingly. Future perspectives p.27, line 27: This sentence is now having an introduction, as a paragraph on the use of EDGARv4.3.2 for completing the inventories for the global stock take has been inserted. p. 27, line 33: This part has been removed, as requested by the reviewer.

Comments on figures and tables Table 2b: is the legend to table 2a. To improve the readability of the Table 2b, the authors provide similar tables for each of the 3 different gases. Figure 11: The authors apologize for the confusion provided with the caption and wanted to indicate that not only fossil but also biofuel is included. The authors decided to present for the global maps of CO_2 (figures 9, 10, 11) always the long-cycle and the short-cycle carbon together. For the buildings sector in fig. 11a this includes also vegetal waste (important in e.g. India), agricultural crop waste, wood and wood waste, and for the transport sector of fig. 11b this includes also the biofuel (important in e.g. Brasil). The authors did not want to confuse the reader with the sector agricultural waste burning or field burning, which are not included here. The caption is rephrased for all figures 9, 10 and 11 and the authors provide in the Supplementary also the figures of the buildings and transport sector for the CO_2 with long cycle carbon (fossil) and for the CO_2 with short cycle carbon (biogenic) separately: figures S5.a,b for the buildings sector and S5.c,d for the transport sector.

Comment on acknowledgement: This has been rephrased, just to specify that EDGAR

was handed over from PBL to JRC and that EDGAR v4 was developed at JRC with a relative large turnover of personnel. The development profited from the substantial contribution of the last 4 authors when they were affiliated to JRC.

Technical corrections: All the typo's have been corrected, as recommended by the reviewer and all changes in the main manuscript are highlighted yellow.

Please also note the supplement to this comment:
https://www.earth-syst-sci-data-discuss.net/essd-2017-79/essd-2017-79-AC1-supplement.pdf

C5
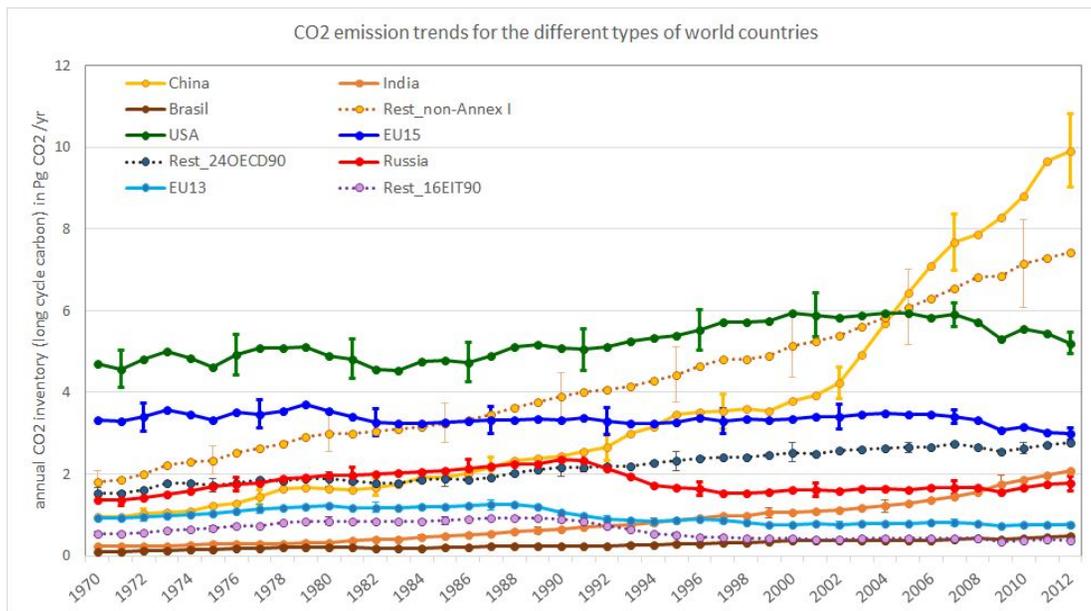
Fig. 1. additional figure S4a: Time series 1970-2012 of CO2 inventories of three different country groups and major emitters

CH4 emission trends for the different types of world countries
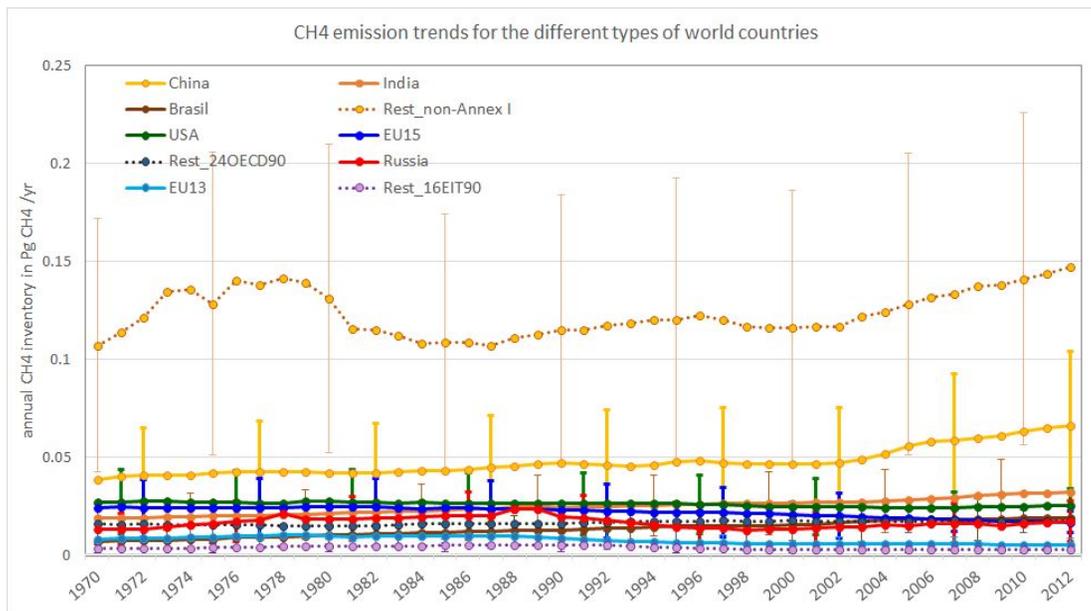
Fig. 2. additional figure S4b: Time series 1970-2012 of CH4 inventories of three different country groups and major emitters

N2O emission trends for the different types of world countries
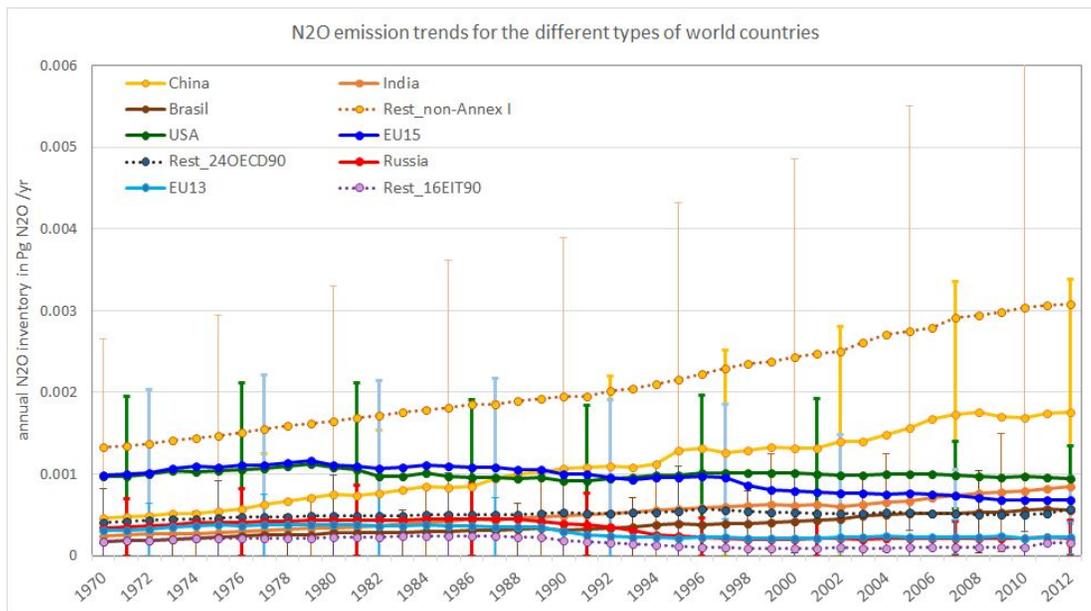
Fig. 3. additional figure S4c: Time series 1970-2012 of N2O inventories of three different country groups and major emitters

C8
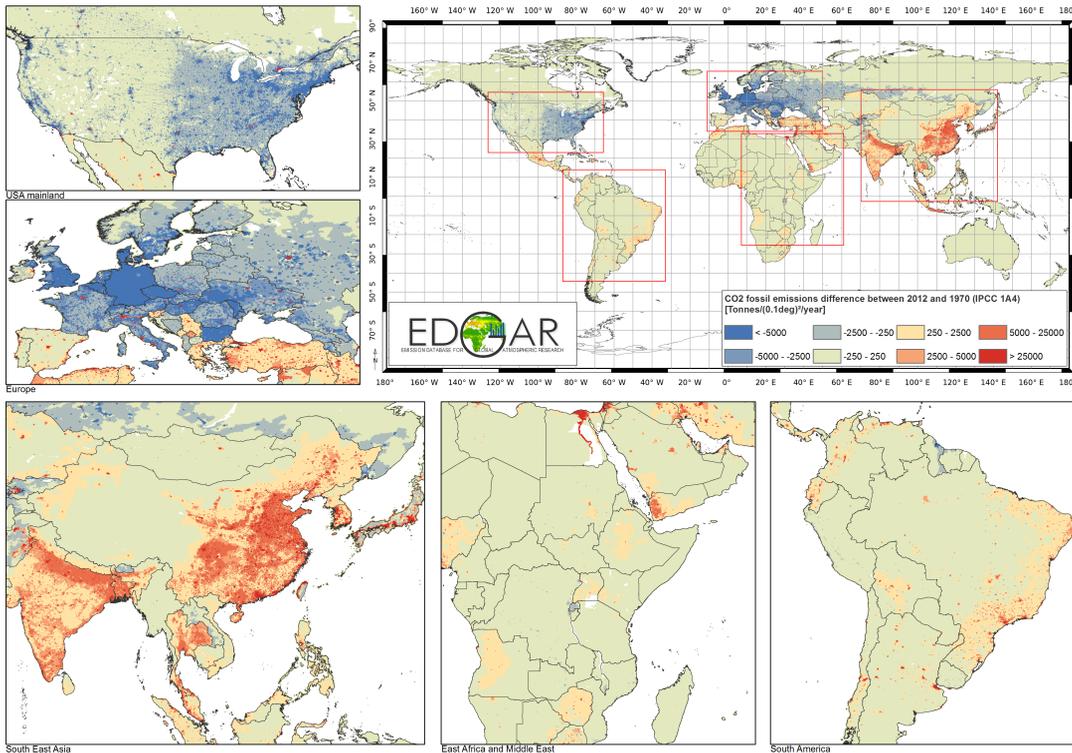
Fig. 4. additional figure S5a: long-cycle carbon CO2 grid map of difference 2012 - 1970 for the buildings sector
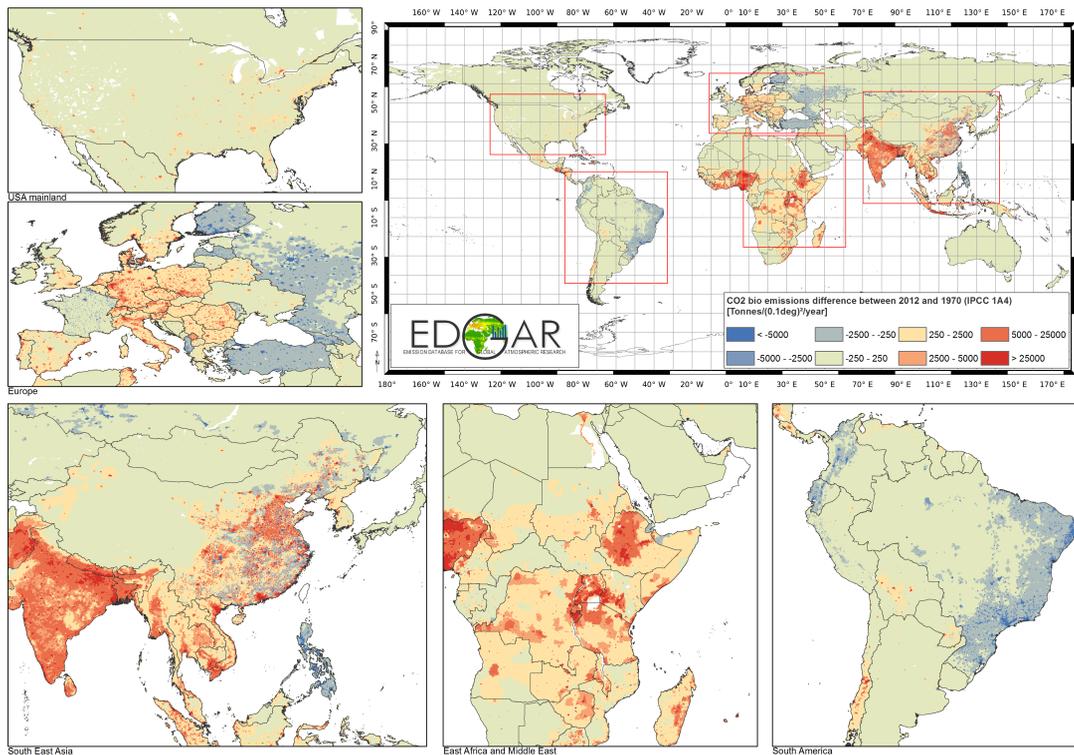
Fig. 5. additional figure S5b: short-cycle carbon CO2 grid map of difference 2012 - 1970 for the buildings sector
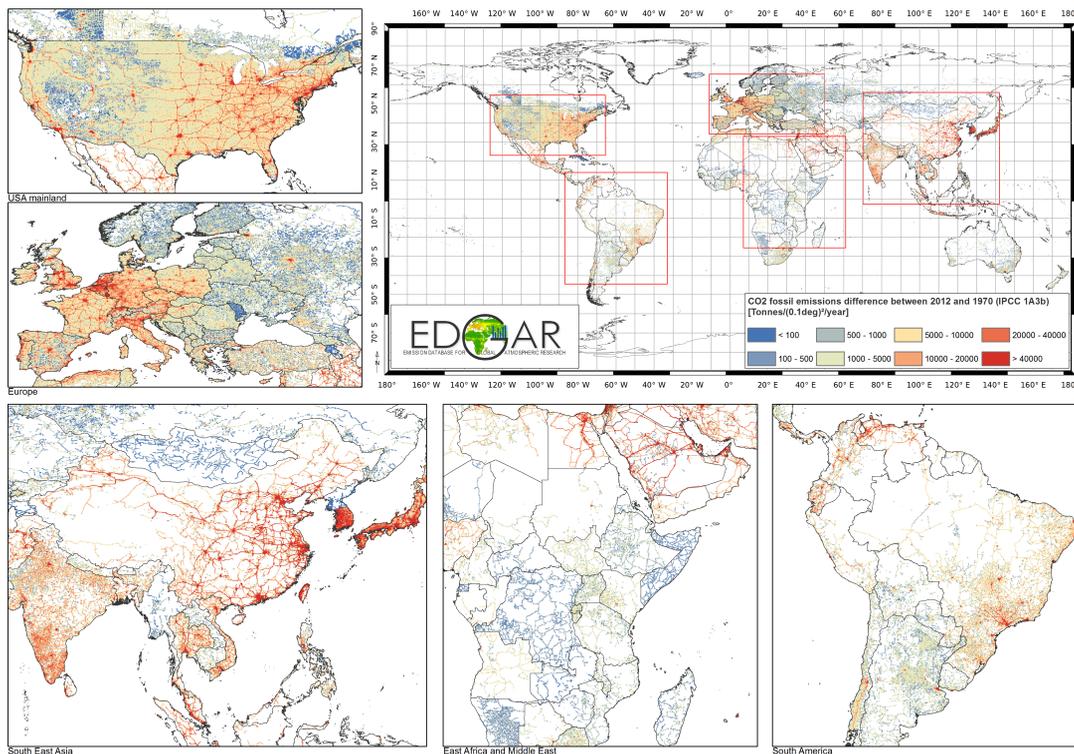
Fig. 6. additional figure S5c: long-cycle carbon CO2 grid map of difference 2012 - 1970 for transport sector
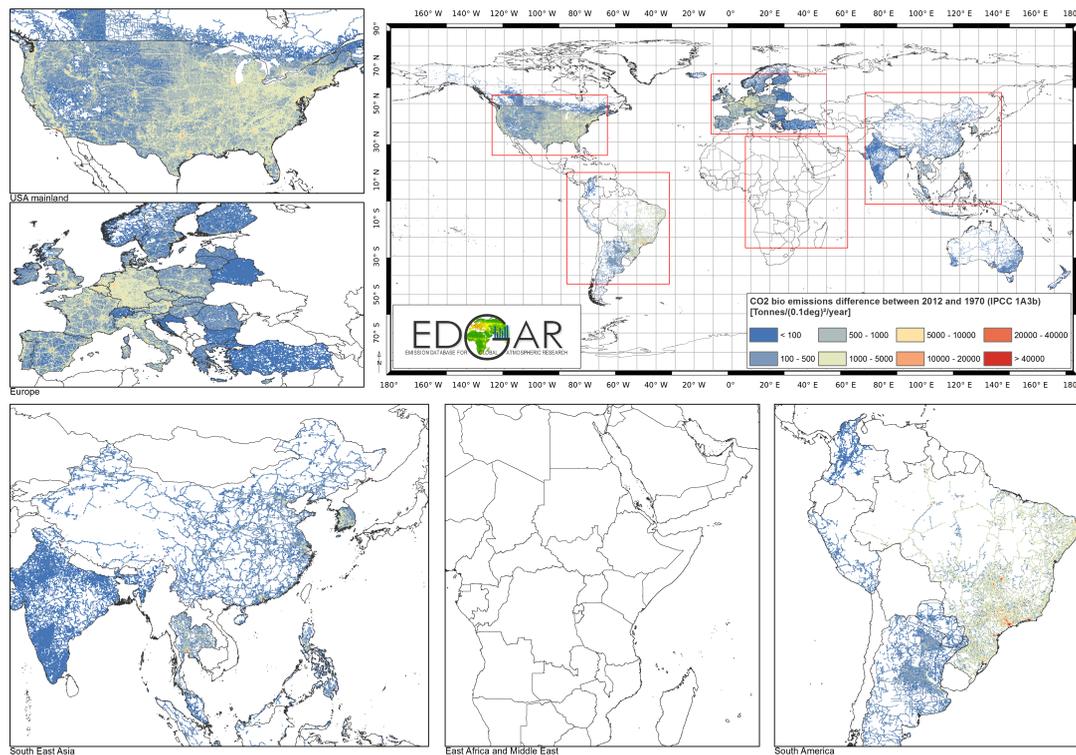
Fig. 7. additional figure S5d: short-cycle carbon CO2 grid map of difference 2012 - 1970 for transport sector