

## ***Interactive comment on “Uncertainties in the EDGAR emission inventory of greenhouse gases” by Efisio Solazzo et al.***

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This is a highly relevant article for anyone that uses the EDGAR emission estimates in scientific research. Any research that uses EDGAR emission data as input, should verify to what extent research findings and conclusions are influenced by taking the uncertainty of the EDGAR emission estimates into account. EDGAR's applications in research are numerous and there is a strong, widely shared need for a peer reviewed reliable and robust assessment of the uncertainty of the estimated emissions.

To assess the uncertainty of the EDGAR emission data, the authors basically estimate the individual uncertainty of all components of the emission calculations performed by EDGAR, and then combine and aggregate these uncertainties to come to a total uncer-

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tainty. EDGAR emission estimates consist of many separate emission source contributions, of which the uncertainties vary widely between source groups, substances and regions. The article currently under review is an essential reference to those EDGAR users who want to understand how uncertainty has been quantified, down to the level of individual combinations of substance, source and region. And because the EDGAR database is extensive by design, the article is (and should be) relatively long, detailed and complete to serve this purpose.

The length and degree of detail may make an article like this somewhat harder to review though, and I have not checked each individual component of the uncertainty assessment. I have found the numerous assumptions that need to be made in an assessment like this to be all adequately referenced and, as far as possible based on peer reviewed research.

As mentioned this article will serve as an essential and comprehensive reference to EDGAR users and it is therefore important that it gets published. The largest scientific value of the article is not so much in all these details but rather in what they amount to when correctly interpreted and combined in a statistically sound manner. The total global uncertainty of the emissions of the three discussed greenhouse gases in EDGAR is indeed a new and valuable scientific insight that was previously not available to the scientific community. In addition the methodology described appears consistent and statistically sound, and I would consider the methodology a valuable tool to apply in other local, regional and global emission databases.

General recommendations:

The article would probably benefit from review by a native English speaker (which I am not) and perhaps a somewhat more liberal use of comma's in long sentences.

An important finding of this research is also that for several sources of methane and especially nitrous oxide, current literature estimates of the emission factor uncertainties were found to be very high, in fact so high that the authors chose to replace these

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uncertainty estimates by their own assumptions. The article might benefit from a somewhat more elaborate substantiation of why these new uncertainty ranges were chosen, and what consequences the new ranges have for the total uncertainty. Please be aware that these assumptions are somewhat of a weaker spot in the research.

A welcome addition to the summary may be a short qualitative explanation of what happens to the total uncertainty when the emission totals would be disaggregated to the level of regions and/or individual countries. Does the (relative) uncertainty of the regional totals remain the same because of methodological dependencies, or increase considerably. Also good to mention in the summary that uncertainty of the spatial distribution in EDGAR is outside the scope of the article and not considered.

Lastly, different methodological choices for estimating uncertainties may result in a different outcome. Would you say that you are discussing the 'uncertainty of the chosen method to quantify the uncertainty'?

Specific comments:

Line 26: Do you mean 'global sum' instead of 'global average'?

Line 29: 'accounts' should be 'account'

Line 36: 'of 1/4' should be '1/4rd'

Line 36: The sentence starting with 'Significant efforts..' might be rephrased as it is difficult to understand the point that is being made.

Lines 42 and 43: Not clear to me what you mean by 'less controversial and more responsive sources'

Line 57: Not clear to me what is meant by 'Scientific/assessment/impact purposes'

Line 72: 'relying' should probably be 'relying'

Line 81: Perhaps replace 'goodness' by 'quality'

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Line 99 – 101: I would say that the primary source of emission factor uncertainty is the degree of representativeness of the limited number of observations underlying the emission factor, for the activity that is addressed. So rather the representativeness of the emission factor instead of any measurement errors.

Line 653: Please use subscript for the 2 in N<sub>2</sub>O

Lines 655 to 665: If you decide to add more text to explain why and how you chose to replace some literature ranges for CH<sub>4</sub> and N<sub>2</sub>O uncertainties by your own assumptions, it would be good to include a reference here to that text

Line 676: would you rather say 'made' instead of 'used' here?

Recommendations regarding specific tables/figures:

Regarding Table 1 it may be good to mention in the text discussing this table that in general, small uncertainties are normally distributed, and large uncertainties (e.g. 'a factor of 5') are often lognormally distributed (this is just something that you may consider mentioning)

I have a difficulty understanding and interpreting Table 7. Could you give some additional explanation in the text what exactly the numbers in Table 7 mean and represent?

Please use sufficiently large font size in all figures. I have difficulty reading them because they are so small. You may decide to leave out some labels to make more room for larger characters, and the figures easier on the eye.

The 'look' of the bar charts may be improved. The bars look very bulky and all very similar (e.g. Figure 2 etc.), only the colors vary. You might consider a different way of presenting the data, but this would be up to you.

Please make sure that the text explaining the figures and the captions (notably figures 13 and 14) is sufficient to easily understand what the figures show/represent and how to interpret them. It took me quite some time to 'sort of' understand them and this

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should not be necessary in my opinion.

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