

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2021-226**

Anonymous Referee #1

Referee comment on "High-resolution biogenic global emission inventory for the time period 2000–2019 for air quality modelling" by Katerina Sindelarova et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-226-RC1>, 2021

Review of "High resolution biogenic global emission inventory for the time period 2000-2019 for air quality modelling" by Sindelarova et al.

This paper presents 3 new emission inventories for biogenic VOCs globally at a spatial resolution of X(**) and a time resolution of monthly for the years 2000 – 2019. The purpose of the new emission inventories is so that others can easily drive climate and air quality models without having to make the emission calculations themselves. The 3 inventories simulate biogenic emissions using:

- V2.1: ERA-Interim meteorology
- V3.1: The newer ERA-5 meteorology and updated isoprene emissions
- V3.0: ERA-5 and allowing land use changes over the period 2000 – 2019

V3.1 is the recommended dataset to use, unless the model being run uses ERA-Interim as input.

I do wonder whether monthly time resolution is enough for air quality models – I guess it depends on what the focus is of the study. If it's a day-to-day study of the impacts of biogenic emissions on city summertime smogs then monthly is probably too coarse a resolution. There can be wide fluctuations in emissions on day-to-day basis in summer. Some clarification is needed here.

The paper is well written and is easy to follow. I only have some minor suggestions, and one possible error which needs checking.

**Actually, I'm not clear on the spatial resolution of the final products? The resolution of some of the input data is given, but unless I've missed it, I can't find a resolution in the body of the manuscript (Ok – the resolution appears in the data availability section at the end). The resolution should be included in the abstract at line 18 where 'high resolution' is mentioned.

Line 60. Sentence doesn't sound quite right.

Line 75 + 77. First time we see these acronyms. MEGAN gets spelled out later in the next section, but might be worth doing here. Also LPJ-GUESS and JULES.

Line 155 'A' list of the MEGAN...

Line 170. Note that though 'the' corn....

Line 228. 'calculated from the EP maps'. Think that EP maps here actually should be EF maps? Check.

Line 256. Just a side question – why is there only detailed land cover for Europe?

Line 315. I understand it is easy to aggregate all crops into one PFT, but then what emissions are 'crops' given? Eg I think corn is quite a high BVOC emitter compared to other crops, and could distort the average.

Line 453 'temporal'

Line 456 'sources'

Figure 2. There looks to be an upward trend in the isoprene with time. It'd be interesting to comment or compare with the isoprene trend from the run where the land-use changes were taken into account (v3.0?). Do we think the upwards trend seen here is purely due to increasing temperatures?

Table 5. Error in longitude extent which needs checking. At first I thought the east and west were the wrong way round. America is definitely west. Australia and south-east Asia are definitely east. SE Asia (India) starts around 67E and Australia 110E so the extents don't look correct either. Potentially values in this table aren't correct if these longitudes have been used in calculations.

Line 512. Calculated with 'the' static....

Line 514. 'A' similar observation...

Line 606. Add 'E' and 'N' to the domain extents.

Figures 7 + 8. The red of the MEGAN-MACC and CAMS-GLOB-BIOv3 lines are very similar. I was initially confused by the statement that CAMS-GLOB-BIO fell within the range (I'd confused it with MEGAN-MACC). Tricky when there are lots of colors in play, but perhaps the CAMS-GLOB models could be shades of red/orange and MEGAN-MACC gets a different color? I also struggled to see the yellow MEGAN 2 line - but then realised it was just a circle - perhaps remove the yellow line from the legend? Ditto for monoterpenes plot.