Errors in gridded data of REASv3.2

Regional Emission inventory in ASia (REAS) version 3.2 was released on 28 October 2020 with Kurokawa and Ohara (2020) from a data download site of REAS (https://www.nies.go.jp/REAS/). However, the gridded data were revised due to errors in those of NMVOC emissions from non-combustion sources and those of all species from power plants as point sources. The updated data were released as REASv3.2.1. In this document, the errors and corrections are described.

1. Errors in gridded data of NMVOC emissions from non-combustion sources

In development of gridded data of NMVOC emissions from non-combustion sources except for those in Japan, wrong spatial and temporal allocation factors were used in REASv3.2. Table 1 shows 20 categories of NMVOC species (including Total) defined in REAS. During processes of creating gridded data, appropriate allocation factors need to be selected for each emission sector (see Sect. S9 of "Supplementary information and data to methodology of REASv3" that is the Supplement of Kurokawa and Ohara (2020)) and for one specific sector, the same spatial and temporal allocation factors must be used for all NMVOC species categories. But in REASv3.2, due to errors in a source code for creating gridded data, wrong spatial allocation factors were used for all non-combustion sources as follow: those for road transport sector for Ethane, Pentanes, and Total; urban population for Propene; and total population for other species categories. For monthly allocation factors, those for oil refinery were used for Pentanes, and numbers of days in each month were used for other species categories for all non-combustion sources. In REASv3, gridded data of NMVOC emissions from 20 species categories are provided separately. In the datasets, values of emissions in each grid of Total (species category code "20" in Table 1) must be the same as total values of emissions of 19 species categories in corresponding grid. However, for sector categories including non-combustion sources (see the next paragraph), the values are different due to errors described above in REASv3.2. These errors were corrected in REASv3.2.1.

The influence of corrections of above errors depends on sources and species categories. The corrections were done for following sector categories (sector categories codes) of gridded data: Industry (INDUSTRY), road transport (ROAD_TRANSPORT), extraction and handling of fossil fuels (EXTRACTION), solvent use (SOLVENTS), waste treatment (WASTE), and total (TOTAL). Differences of NMVOC emission grid maps between REASv3.2 and REASv3.2.1 are provided in another document available from the data download site of REAS (https://www.nies.go.jp/REAS/).

Note that spatial and temporal allocation processes were independently done for each region (33, 17, and 6 regions in China, India, and Japan, respectively) and country

defined in REAS (Kurokawa and Ohara (2020)). Therefore, total emissions in each region and country are the same between REASv3.2 and REASv3.2.1 for each NMVOC species category. Also note that there is no difference of emissions in Japan between REASv3.2 and REASv3.2.1 because the spatial and temporal allocations were conducted by the different system for Japan.

Table 1. NMVOC species categories defined in REAS.

Species number code	NMVOC species
01	Ethane
02	Propane
03	Butanes
04	Pentanes
05	Other alkanes
06	Ethylene
07	Propene
08	Terminal alkenes
09	Internal alkenes
10	Acetylene
11	Benzene
12	Toluene
13	Xylenes
14	Other aromatics
15	Formaldehyde
16	Other aromatics
17	Ketones
18	Halocarbons
19	Others
20	Total

2. Errors in emission data of all species from power plants as point sources

In gridded data of power plants as point sources of REASv3.2, wrong longitude and latitude was assigned to one power plant in Andhra Pradesh in India as follows:

REASv3.2 (wrong)[*]: (Longitude, Latitude) = (103.08356, -1.00424)

REASv3.2.1 (corrected): (Longitude, Latitude) = (80.12040, 14.32822)

[*]The point of wrong longitude and latitude (103.08356, -1.00424) locates in Indonesia.

Note that in REASv3.2, emissions from two units in the same location were allocated to (103.08356, -1.00424) (wrong) and (80.12040, 14.32822) (correct). Therefore, in corrected data of REASv3.2.1, total emissions of two units were allocated to (80.12040, 14.32822). In addition, emissions from the corresponding power plant appeared from 2014. Therefore, before 2013, there are no changes in data files for emissions from power plants as point sources from REASv3.2 to REASv3.2.1.

References

Kurokawa, J. and Ohara, T.: Long-term historical trends in air pollutant emissions in Asia: Regional Emission inventory in ASia (REAS) version 3, Atmos. Chem. Phys., 20, 12761–12793, https://doi.org/10.5194/acp-20-12761-2020, 2020.