

# Regional Emission inventory in ASia (REAS) Data Download Site

For the analysis of long-term trends of the Asian atmospheric environment, the first inventory of historical and future projected emissions in Asia, the Regional Emission inventory in ASia (REAS) 1.11 has been developed and opened since 2007. Recently, we have updated the REAS inventory and opened as version 2.1 in this website. Datasets of Regional Emission inventory in Asia for Persistent Organic Pollutants (REAS-POP) 1.0 which focuses on polycyclic aromatic hydrocarbons (PAHs) in North east Asia are also provided.

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## Remarks for update information

### 14-November-2013

- Gridded emissions for industry sector have been updated using the location and annual capacities of corresponding plants in each country and region. Data sets in the download table "Gridded Data Sets" have not been updated but new table "Updated Gridded Data Sets for Industry Sector" were added.
- Errors both in the gridded and table data for CO<sub>2</sub> emissions in China have been corrected.

## General Information

### REAS2.1

**Species:** SO<sub>2</sub>, NO<sub>x</sub>, CO, NMVOC, PM<sub>10</sub>, PM<sub>2.5</sub>, BC, OC, NH<sub>3</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub>

**Years:** 2000-2008

**Area:**

East, Southeast, South, and Central Asia. Asian part of Russia (Far East, Eastern and

Western Siberia, and Ural)

**Emission sources:**

Fuel combustions in power plants, industry, transport, and domestic sectors; Industrial process; Agricultural activities (fertilizer application and livestock); and Others (fugitive emissions, solvent use, human, etc.)

**Spatial resolution:** 0.25 degree by 0.25 degree

**Temporal resolution:** Monthly

**Japan:**

Emissions except for the maritime sector were from the Japan Auto-Oil Program (**JATOP**) Emission Inventory-Data Base (JEI-DB) developed by **JPEC** (2012a, 2012b, 2012c). Emissions from the maritime sector were taken from the database developed by the Ocean Policy Research Foundation (**OPRF**, 2012). The maritime emission data were developed under the project named 'the comprehensive project of assessment for improving the air quality by establishment of the emission control areas (ECA) in Japan', which is supported from the grant by the Nippon Foundation derived from revenues from motorboat racing. NMVOC evaporative emissions from stationary sources in Japan were from data developed by Ministry of the Environment of Japan (MOEJ, 2009).

**Korea, Rep. of:**

Emissions relied on the Clean Air Policy Support System (CAPSS) developed by Lee et al. (2011). Data were taken from the National Air Pollutants Emission website maintained by **the National Institute of Environment Research-Korea**.

**Taiwan:**

Emissions data sets were obtained from **the Environmental Protection Administration of Taiwan at its website**.

**EDGAR 4.2:**

Datasets for aviation (both domestic and international at altitude less than 1km) and international navigation were taken from EDGAR 4.2 (EC-JRC/PBL, 2011). Emissions related to agricultural activities for Asian Russia and Central Asia were also obtained from EDGAR 4.2.

**REAS POP 1.0****Species:**

fluoranthene (Flu), pyrene (Pyr), benz[a]anthracene (BaA), chrysene (Chr)  
benzo[b]fluoranthene (BbF), benzo[k]fluoranthene (BkF), benzo[a]pyrene (BaP),  
indeno[1,2,3-cd]pyrene (IcdP), benzo[g,h,i]perylene (BghiP))

**Years:** 2005

**Area:** Northeast Asia (China, Far East Russia, North Korea, South Korea, Mongolia, Taiwan, Japan)

**Emission sources:**

Fuel combustions in power plants, industry, transport, and domestic sectors; Industrial process; and Open biomass burning\*

\*Fuel consumption rates were derived from REAS 1.11. PAH emission from open biomass burning was estimated using the burned area, the BC emission rate, and the PAH and BC emission factors. The burned area and the BC emission rate were derived from GFEDv3.

**Spatial resolution:** 0.5 degree by 0.5 degree

**Temporal resolution:** Monthly

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## Data Sets

### Overview Papers

- [REAS 2.1: Kurokawa et al., Atmos. Chem. Phys., 13, 11019-11058, 2013](#)
- [REAS 1.11: Ohara et al., Atmos. Chem. Phys., 7, 4419-4444, 2007](#)
- [REAS POPs: Inomata et al., Environ. Sci. Technol., 46, 4941-4949, 2012](#)

### REAS 2.1

#### Gridded Data Sets (Information for Data)

	S02	NOx	CO	PM10	PM2.5	BC	OC	NMV	NH3	CH4	N2O	CO2
2000	●	●	●	●	●	●	●	●	●	●	●	●
2001	●	●	●	●	●	●	●	●	●	●	●	●
2002	●	●	●	●	●	●	●	●	●	●	●	●
2003	●	●	●	●	●	●	●	●	●	●	●	●
2004	●	●	●	●	●	●	●	●	●	●	●	●
2005	●	●	●	●	●	●	●	●	●	●	●	●
2006	●	●	●	●	●	●	●	●	●	●	●	●

2007	●	●	●	●	●	●	●	●	●	●	●	●
2008	●	●	●	●	●	●	●	●	●	●	●	●

### Updated Gridded Data Sets for Industry Sector (see Remarks above)

	S02	NOx	CO	PM10	PM2.5	BC	OC	NMV	NH3	CH4	N2O	CO2
2000-2008	●	●	●	●	●	●	●	●	●	●	●	●

### Country and Regional Tables (Information for Data)

	S02	NOx	CO	PM10	PM2.5	BC	OC	NMV	NH3	CH4	N2O	CO2
2000	●	●	●	●	●	●	●	●	●	●	●	●
2001	●	●	●	●	●	●	●	●	●	●	●	●
2002	●	●	●	●	●	●	●	●	●	●	●	●
2003	●	●	●	●	●	●	●	●	●	●	●	●
2004	●	●	●	●	●	●	●	●	●	●	●	●
2005	●	●	●	●	●	●	●	●	●	●	●	●
2006	●	●	●	●	●	●	●	●	●	●	●	●
2007	●	●	●	●	●	●	●	●	●	●	●	●
2008	●	●	●	●	●	●	●	●	●	●	●	●

### REAS POP 1.0

#### Gridded Data Sets (Information for Data)

	Flu	Pyr	BaA	Chr	BaP	BbF	BkF	BghiP	IcdP
2005	●	●	●	●	●	●	●	●	●

### REAS 1.11

# References

## REAS 2.1

Kurokawa, J., Ohara, T., Morikawa, T., Hanayama, S., Greet, J.-M., Fukui, T., Kawashima, K. and Akimoto, H.: Emissions of air pollutants and greenhouse gases over Asian regions during 2000-2008: Regional Emission inventory in ASia (REAS) version 2, *Atmos. Chem. Phys.*, 13, 11019-11058.

EC-JRC/PBL (European Commission, Joint Research Center/Netherlands Environmental Assessment Agency), Emission Database for Global Atmospheric Research (EDGAR), release version 4.2, 2011.

JPEC (Japan Petroleum Energy Center): Emission inventory of road transport in Japan, JPEC Technical Report, JPEC-2011AQ-02-06, 136pp [in Japanese], 2012a.

JPEC: Emission inventory of sources other than road transport in Japan, JPEC Technical Report, JPEC-2011AQ-02-07, 288pp [in Japanese], 2012b.

JPEC: Speciation profiles of VOC, PM, and NO<sub>x</sub> emissions for atmospheric simulations of PM<sub>2.5</sub>, JPEC Technical Report, JPEC-2011AQ-02-08, 69pp [in Japanese], 2012c.

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OPRF (Ocean Policy Research Foundation (Ship and Ocean Foundation)): Report for comprehensive study for environmental impact lead by the establishment of emission control area in Japan, ISBN978-4-88404-282-0, 524pp [in Japanese], 2012.

## REAS POPs 1.1

Inomata, Y., Kajino, M., Sato, K., Ohara, T., Kurokawa, J., Ueda, H., Tang, N., Hayakawa, K., Ohizumi, T., and Akimoto, H.: Emission and atmospheric transport of particulate PAHs in Northeast Asia, *Environ. Sci. Technol.*, 46, 4941-4949, 2012 [link].

Giglio, L., Randerson, J. T., Van der Werf, G. R., Kasibhatla, P. S., Collatz, G. J., Morton, D. C., and DeFries, R. S.: Assessing variability and long-term trends in burned area by merging multiple satellite fire products, *Biogeosci.* 7, 1171-1186, 2010 .

## REAS 1.11

Ohara, T., Akimoto, H., Kurokawa, J., Horii, N., Yamaji, K., Yan, X., and Hayasaka, T.: An Asian emission inventory of anthropogenic emission sources for the period 1980-2020, *Atmos. Chem. Phys.*, 7, 4419-4444, doi:10.5194/acp-7-4419-2007, 2007.

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