Task Force on Hemispheric Transport of Air Pollution

EDGAR-HTAPv3 Emissions Mosaic

Overview of development plan

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EDGAR-HTAPv2

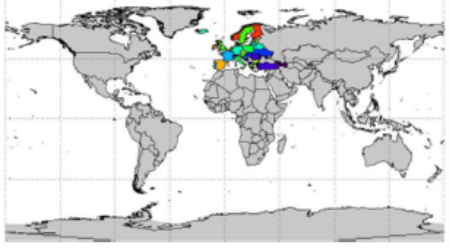
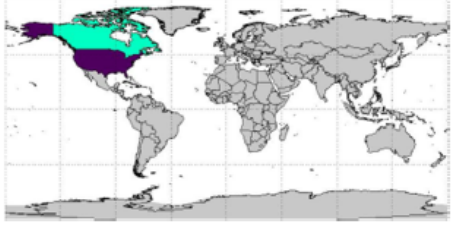
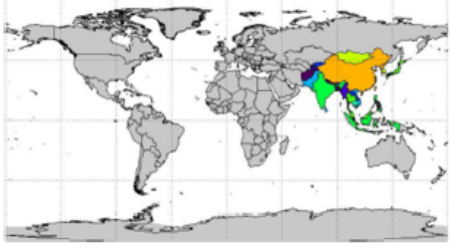
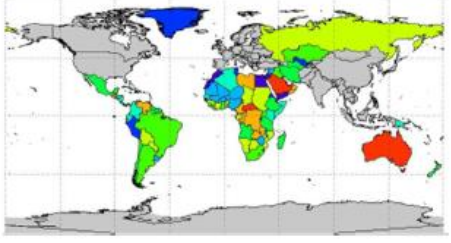
- Published 2015
  - Janssens-Maenhout, G., Crippa, M., Guizzardi, D., Dentener, F., Muntean, M., Pouliot, G., Keating, T., Zhang, Q., Kurokawa, J., Wankmüller, R., Denier van der Gon, H., Kuenen, J. J. P., Klimont, Z., Frost, G., Darras, S., Koffi, B., and Li, M.: HTAP_v2.2: a mosaic of regional and global emission grid maps for 2008 and 2010 to study hemispheric transport of air pollution, Atmos. Chem. Phys., 15, 11411–11432, https://doi.org/10.5194/acp-15-11411-2015, 2015.
  - First paper published in the HTAP/AQMEII/MICS joint special issue (ACP)

- Basis for HTAP phase 2 global assessments
  - 47 papers in the joint special issue

- Widespread use beyond the LRTAP Convention
  - ~250 citations

EDGAR-HTAPv2

- Global, 0.1 x 0.1 degree resolution “Emissions Mosaic”

EMEP-TNO (MACCII)	US EPA _Environ Can	MICS-Asia (+ REAS2.1)	EDGARv4.3 (prelim.)
Country inventories + point sources	State inventories + point sources	County inventory for China + country inventories from CAPSS & REAS 2.1	Country inventories from the preliminary version of EDGARv4.3
All except international shipping and except international aviation	All except international shipping and except international aviation	All except international shipping, international aviation and agricultural waste burning	All inclusive international shipping and international aviation
Yearly grid maps (monthly profiles of EMEP model added)	Monthly profiles	Monthly grid maps	Monthly profiles (for three different latitude bands)
$0.125° \times 0.0625°$ converted to $0.1° \times 0.1°$ by raster resampling with factor 1/5x1/5 and aggregation of 4×8	$0.1° \times 0.1°$ and height profiles	$0.25° \times 0.25°$ converted to $0.1° \times 0.1°$ by raster resampling $1/5 \times 1/5$ and aggregation of 2×2	$0.1° \times 0.1°$
CO, NMVOC, NO_x, SO_2, NH_3, PM coarse and fine and BC/OC fractions	CO, NMVOC with speciation, NO_x, SO_2, NH_3, PM_{10}, PMfine, BC and OC	CO, NMVOC, NO_x, SO_2, NH_3, PM_{10}, $PM_{2.5}$, BC and OC	CO, NMVOC, NO_x, SO_2, NH_3, PM_{10}, $PM_{2.5}$, BC and OC
			

EDGAR-HTAPv2: limitations

- Only 2008 and 2010
  - No trend analysis possible
- Only 7 sectors
  - AIR; SHIPS; ENERGY; INDUSTRY; TRANSPORT; RESIDENTIAL; AGRICULTURE
  - Difficult to assess specific policy interventions
- Outdated
  - Newer information is available

EDGAR-HTAPv3: aspirations

- Longer time series
  - Trend analysis
- Improved sectoral resolution
  - More detailed source-receptor relationships
  - Better basis for emission scenarios
- Additional regional inventories

EDGAR-HTAPv3: timeline

- 2020 Q1: scoping
  - Initial discussions TF-HTAP and JRC
  - Survey of regional emission data providers
  - Collection of expressions of interest
- 2020 Q2-3: data collection and harmonisation
  - Emission sectors
  - Spatial resolution
  - Time period
- 2020 Q3-4: mosaic development and assessment
  - Tool development
  - Consistency checks
- 2021 Q1: release
- 2021 Q4: publication

EDGAR-HTAPv3: partners

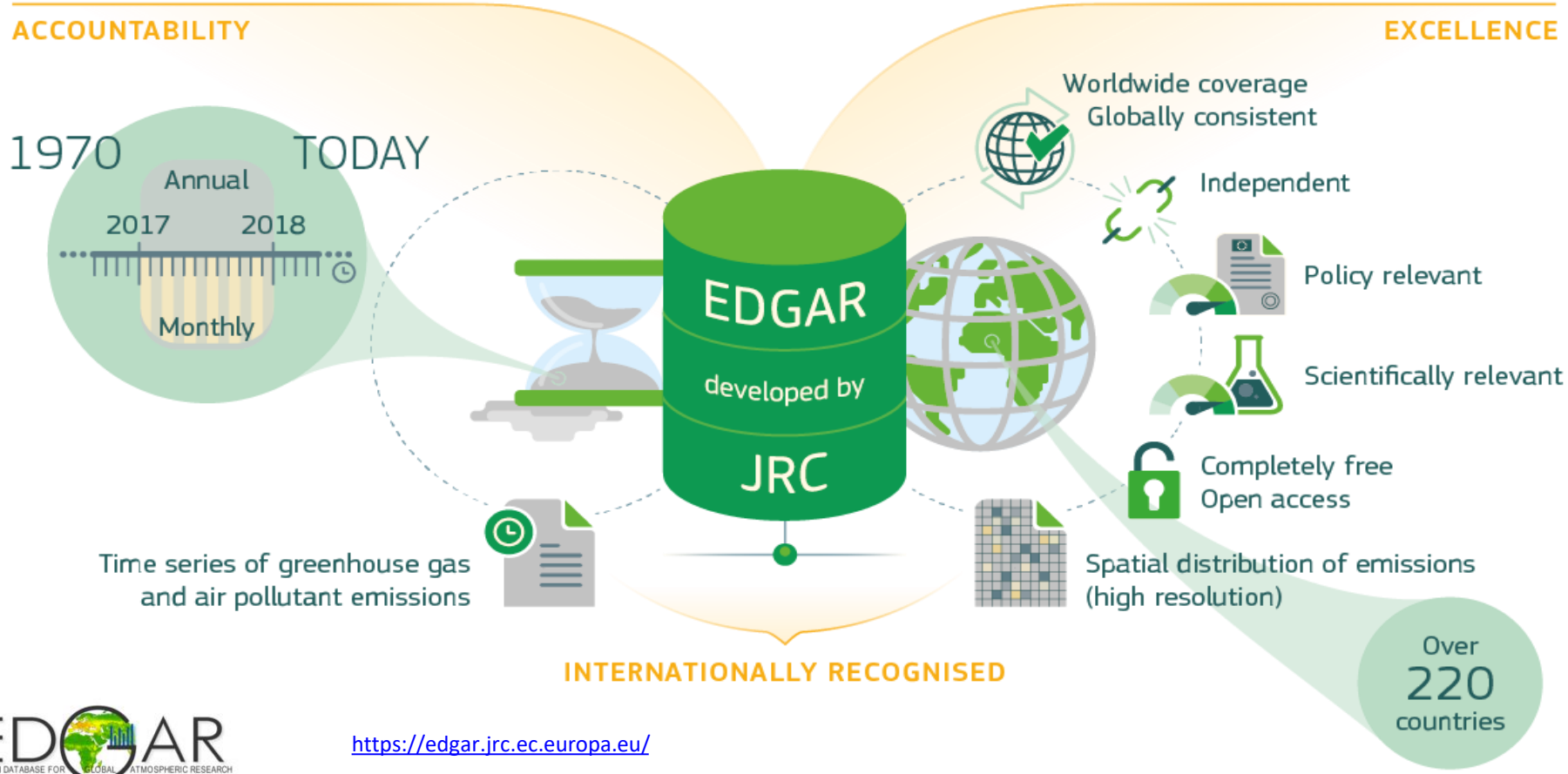
- Global inventory
  - EDGARv5
- Europe
  - CAMS-REG-AP
- North America
  - EPA and Environment Canada
- Asia
  - REASv3: (India, China, Japan, Koreas, South East Asia, Indonesia)
  - MIX: mosaic of regional Asian inventories, under development
- Other regions
  - Australia, Argentina, and Chile

EDGAR-HTAPv3: next steps

- Determine the largest possible set of sectors
  - Discussions ongoing

- Extrapolate beyond 2015
  - CEDS?

The Emissions Database for Global Atmospheric Research



EDGAR
EMISSION DATABASE FOR GLOBAL ATMOSPHERIC RESEARCH

https://edgar.jrc.ec.europa.eu/

Novelties of EDGARv5

- ✓ 1970-2015 emissions of GHG and AP consistently estimated for all world countries
- ✓ updated technologies, abatement measures and emission factors for power generation and road transport
- ✓ Estimates of particulate matter emissions from road surface wear and road vehicle tyre and break wear
- ✓ new high time resolution emissions (monthly and hourly)
- ✓ new population-based proxy data

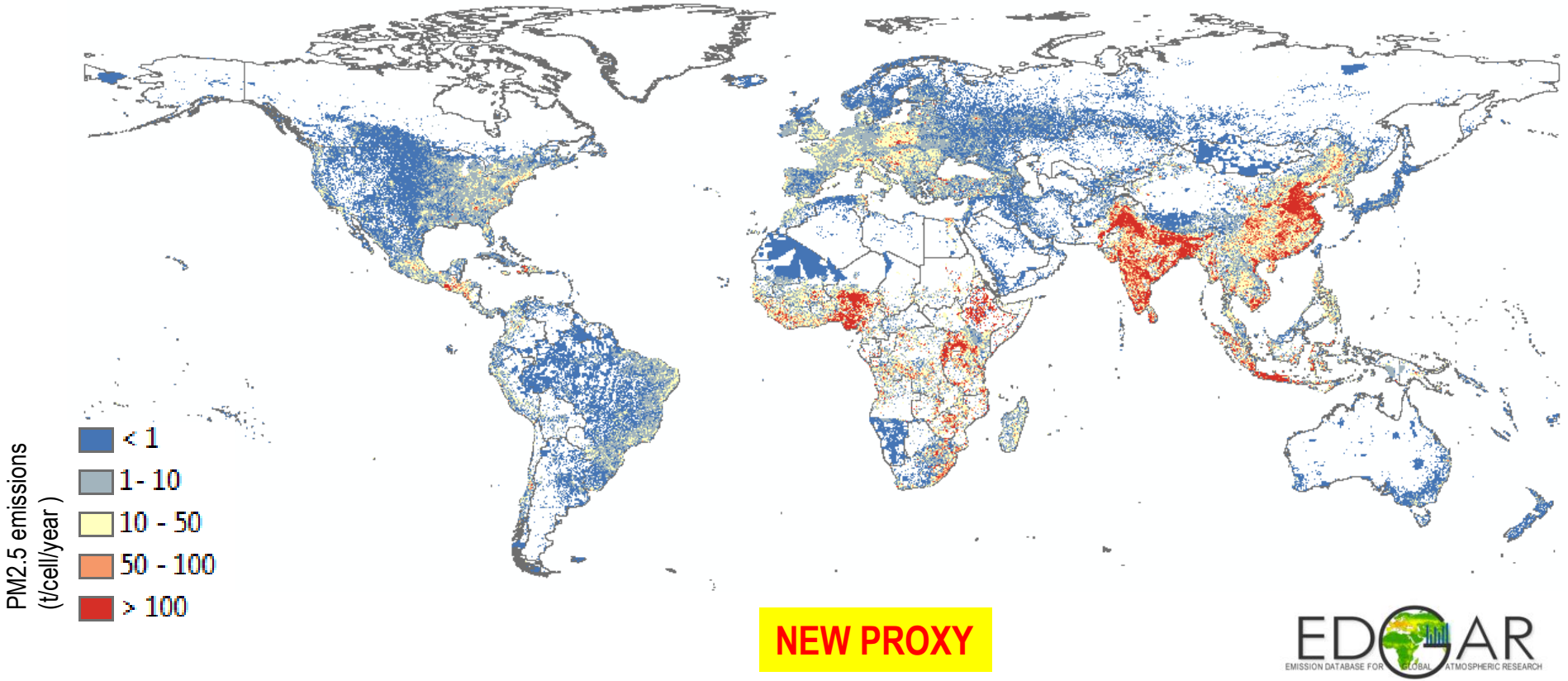
New population- based spatial proxies in EDGAR

Population distribution (urban and rural) is a fundamental proxy in EDGAR to spatially distribute anthropogenic emissions from different sectors.

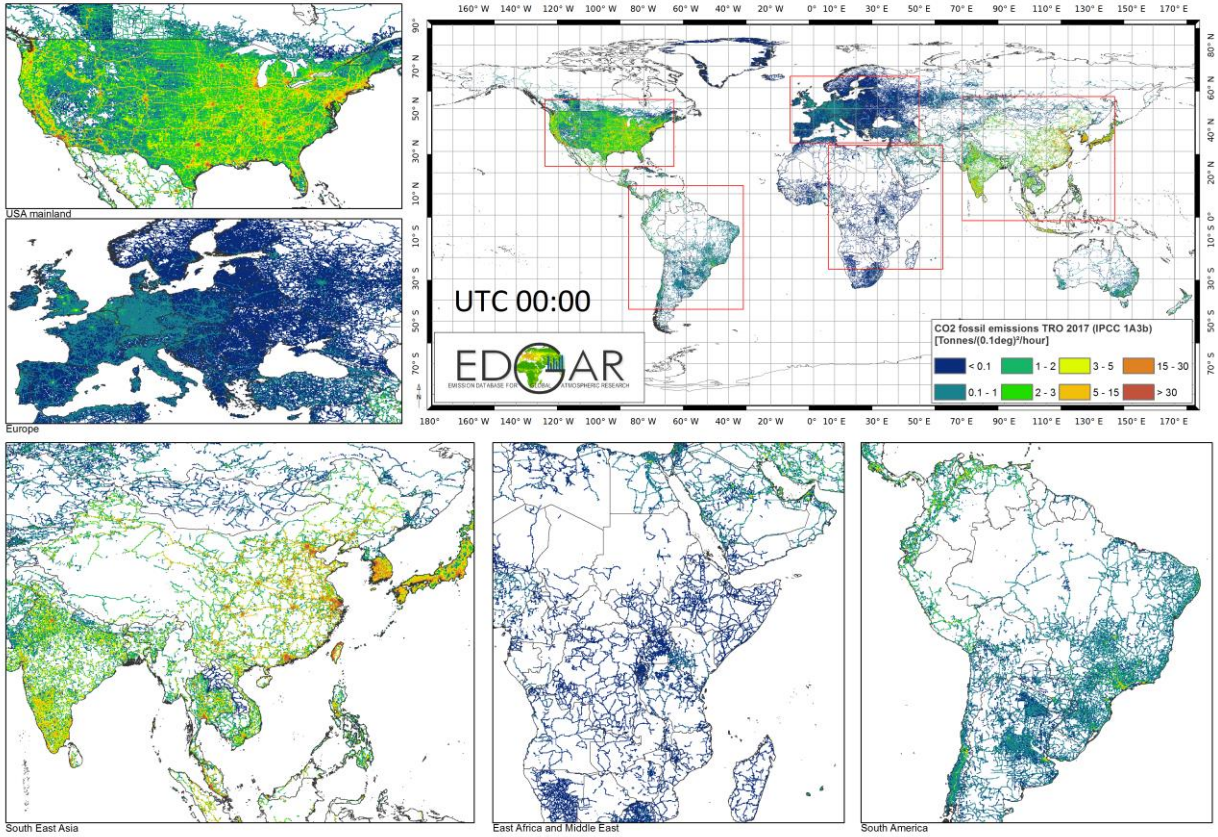
- **The "new" EDGAR population proxy** is based on the JRC Global Human Settlements Layer work: latest population census data (CIESIN GPWv4) + satellite imagery of built up areas (Landsat 8).

- Six categories of human settlements: **mostly uninhabited rural, dispersed rural areas, villages, towns, suburbs and urban centres** for 1975, 1990, 2000, 2015 ("Refined Degree of Urbanization" (Degurba+)).

PM2.5 emissions from residential combustion in 2015



New temporal profiles



Road transport hourly CO2 emissions (17th Jan 2017)

Crippa et al..: High resolution temporal profiles in the Emissions Database for Global Atmospheric Research. Sci Data 7, 121 (2020). https://doi.org/10.1038/s41597-020-0462-2.

https://edgar.jrc.ec.europa.eu/overview.php?v=temp_profile

Ongoing EDGAR updates

- Extension of the air pollutant emission time-series
- Update of the agricultural sector
- Inclusion of the Land Use, Land Use Change and Forestry sector (LULUCF)