1 **Supplementary material for paper**

2 **Insights on the spatial distribution of global, national and sub-national GHG emissions in**
3 **EDGARv8.0**

4 **Authors:** Monica Crippa[2], Diego Guizzardi[1], Federico Pagani[2], Marcello Schiavina[6], Michele
5 Melchiorri[1], Enrico Pisoni[1], Francesco Graziosi[1], Marilena Muntean[1], Joachim Maes[5], Lewis
6 Dijkstra[1,5], Martin Van Damme[3,4], Clarisse Lieven[3], Pierre Coheur[3]

8 [1]European Commission, Joint Research Centre (JRC), Ispra, Italy
9 [2]Unisystems S.A., Milan, Italy

10 [3]Spectroscopy, Quantum Chemistry and Atmospheric Remote Sensing (SQUARES),
11 Université libre de Bruxelles (ULB), Brussels, Belgium

12 [4]Royal Belgian Institute for Space Aeronomy (BIRA-IASB), Brussels, Belgium

13 [5]European Commission, Directorate-General for Regional and Urban Policy, Brussels

14 [6]NTT DATA, Rue de Spa, 8, 1000 Bruxelles

15 Correspondence: enrico.pisoni@ec.europa.eu

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Table S1 - Overview of the spatial proxy data used for distributing the sector-specific country totals of EDGARv4.3.2 to 0.1degx0.1deg gridmaps (Janssens-Maenhout et al., 2019).

EDGAR sector	Sector description	Gridmaps	Reference
AGS	Agricultural soils	Animals: buffalo, cattle, chicken, duck, goat, pig, poultry, sheep	livestock: http://livestock.geo-wiki.org/ buffaloes: http://www.fao.org/AG/AGAInfo/resources/en/glw/GLW_dens.html
		Crops: barley, beans, broad bean, cassava, chick peas, cow peas, pasture, lentils, maize, millet, oats, other cereals, other pulses, other roots tubers, peas, potatoes, rice, rye, sorghum, soy bean, sugar beet, sugarcane, sweet potatoes, wheat, yams	Ramankutty, N., A.T. Evan, C. Monfreda, and J.A. Foley (2008), Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000. Global Biogeochemical Cycles 22, GB1003, doi:10.1029/2007GB002952.
		Histosols	FAO Geonetwork, 2007
		Grassland	Global Land Cover map JRC (2000)
AWB	Agricultural waste burning	Crops: barley, beans, broad bean, cassava, chick peas, cow peas, pasture, lentils, maize, millet, oats, other cereals, other pulses, other roots tubers, peas, potatoes, rice, rye, sorghum, soy bean, sugar beet, sugarcane, sweet potatoes, wheat, yams	Ramankutty, N., A.T. Evan, C. Monfreda, and J.A. Foley (2008), Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000. Global Biogeochemical Cycles 22, GB1003, doi:10.1029/2007GB002952.
		Grassland	Global Land Cover map JRC (2000)
CHE	Production of chemicals	adipic acid, ammonia, caprolactam, glyoxal, nitric acid, sulfuric acid	In-house EDGAR proxy

		Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
ENE	**Power industry**	Power plants: auto-producers, coal, gas, oil	CARMA v3 (http://carma.org/) and local data for China
ENF	**Enteric fermentation**	Animals: buffaloes, cattles, goats, pigs, sheeps	livestock: http://livestock.geo-wiki.org/ buffaloes: http://www.fao.org/AG/AGAInfo/resources/en/glw/GLW_dens.html
		Grassland	Global Land Cover map JRC (2000)
FOO	**Production of foods**	Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
FFF	**Fossil Fuel Fires**	coal fires	In-house EDGAR proxy
		gas flaring	In-house EDGAR proxy based on https://www.ngdc.noaa.gov/eog/viirs.html
IND	**Combustion for manufacturing industry**	cement	In-house EDGAR proxy based on USGS (http://mrdata.usgs.gov/mineral-operations/) and EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
		chemical	In-house EDGAR proxy
		mining	In-house EDGAR proxy based on USGS (https://mrdata.usgs.gov/mrds/)
		paper	In-house EDGAR proxy based on EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
		steel	In-house EDGAR proxy

		Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
IRO	**Iron and steel production**	Blast furnace, Basic oxygen furnace, Open hearth furnace, Crude steel, Electric furnace, Sinter, Steel	In-house EDGAR proxy
MNM	**Manure management**	Animals: buffalo, cattle, chicken, duck, goat, pig, sheep	livestock: http://livestock.geo-wiki.org/ buffaloes: http://www.fao.org/AG/AGAInfo/resources/en/glw/GLW_dens.html
		Grassland	Global Land Cover map JRC (2000)
NEU	**Non energy use of fuels**	Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
NFE	**Non-ferrous metals production**	Aluminum production (primary and secondary)	In-house EDGAR proxy
		Copper production (primary and secondary)	In-house EDGAR proxy based on USGS (https://mrdata.usgs.gov/mrds/)
		Magnesium production (primary and secondary)	In-house EDGAR proxy
		Lead production (primary and secondary)	In-house EDGAR proxy
		Zinc production (primary and secondary)	In-house EDGAR proxy based on USGS (https://mrdata.usgs.gov/mrds/)
		Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/

NMM	**Non-metallic minerals production**	cement	In-house EDGAR proxy based on USGS (http://mrdata.usgs.gov/mineral-operations/) and EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
		lime	In-house EDGAR proxy based on USGS (http://mrdata.usgs.gov/mineral-operations/) and EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
		Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
PAP	**Production of pulp and paper**	paper	In-house EDGAR proxy based on EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
PRO	**Fuel exploitation**	Coal mining: brown and hard coal	In-house EDGAR proxy based on EPRTR (http://prtr.ec.europa.eu) and USGS (https://www.usgs.gov/) and Global Energy Observatory (http://globalenergyobservatory.org/)
		gas flaring	In-house EDGAR proxy based on https://www.ngdc.noaa.gov/eog/viirs.html
		Gas pipelines transmission	In-house EDGAR proxy
		oil pipelines	In-house EDGAR proxy
		oil terminals	In-house EDGAR proxy based on World Port Index (PUB 150) (http://msi.nga.mil/MSISiteContent/StaticFiles/NAV_PUBS /WPI/Pub150bk.pdf)
		shipping tankers	In-house EDGAR proxy based on LRIT and Wang et al.

			(2007)
		population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
		Roads: commercial heavy duty, residential	In-house EDGAR proxy based on OpenStreetMap
PRU	**Production and use of other products**	Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
RCO	**Energy for buildings**	fishing	In-house EDGAR proxy based on KNB (Benjamin Halpern, Melanie Frazier, John Potapenko, Kenneth Casey, Kellee Koenig, et al. 2015. Cumulative human impacts: raw stressor data (2008 and 2013). KNB Data Repository. doi:10.5063/F1S180FS.) https://knb.ecoinformatics.org/#view/raw_2013_inorganic_mol_20150714095441
		Rural population, urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
REF_TRF	**Oil refineries and Transformation industry**	coke	In-house EDGAR proxy
		gas flaring	In-house EDGAR proxy based on https://www.ngdc.noaa.gov/eog/viirs.html
		Iron Blast furnace	In-house EDGAR proxy
		mining	In-house EDGAR proxy based on USGS (https://mrdata.usgs.gov/mrds/)
		oil refineries	In-house EDGAR proxy

		oil terminals	In-house EDGAR proxy based on World Port Index (PUB 150) (http://msi.nga.mil/MSISiteContent/StaticFiles/NAV_PUBS/WPI/Pub150bk.pdf)
		Residential Roads	In-house EDGAR proxy based on OpenStreetMap
		Urban population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
SOL	**Application of solvents**	Urban population, rural population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/
SWD_INC	**Solid waste incineration**	Solid waste incineration	In-house EDGAR proxy based on EPRTR (http://prtr.ec.europa.eu)
SWD_LDF	**Solid waste landfills**	Solid waste landfills	In-house EDGAR proxy based on EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
TNR_Aviation_CDS	**Aviation climbing&descent**	domestic aviation climb-out/descending, international aviation climb-out/descending	In-house EDGAR proxy based on Airline Route Mapper (http://arm.64hosts.com/)
TNR_Aviation_CRS	**Aviation cruise**	domestic aviation cruise, international aviation cruise	In-house EDGAR proxy based on Airline Route Mapper (http://arm.64hosts.com/)
TNR_Aviation_LTO	**Aviation landing&takeoff**	domestic aviation takeoff landing, international aviation takeoff landing	In-house EDGAR proxy based on Airline Route Mapper (http://arm.64hosts.com/)
TNR_Aviation_SPS	**Aviation supersonic**	supersonic aviation	In-house EDGAR proxy
TNR_Other	**Railways, pipelines, off-road transport**	Residential Roads	In-house EDGAR proxy based on OpenStreetMap
		railways	In-house EDGAR proxy

TNR_Ship	**Shipping**	Shipping: cargo, passengers, tankers	In-house EDGAR proxy based on LRIT and Wang et al. (2007)
		inland waterways	In-house EDGAR proxy
TRO	**Road transportation**	Roads: commercial heavy and light duty, residential	In-house EDGAR proxy based on OpenStreetMap
WWT	**Waste water handling**	Waste water treatment	In-house EDGAR proxy based on EPRTR (http://prtr.ec.europa.eu) and CEC (http://takingstock.cec.org/)
		Urban population, rural population	In-house EDGAR proxy based on http://sedac.ciesin.columbia.edu/

S2 Comparison of power plant point sources

Figure S1 shows the location of all power plants in EDGARv7.0 and EDGARv8.0 by fossil fuel type.
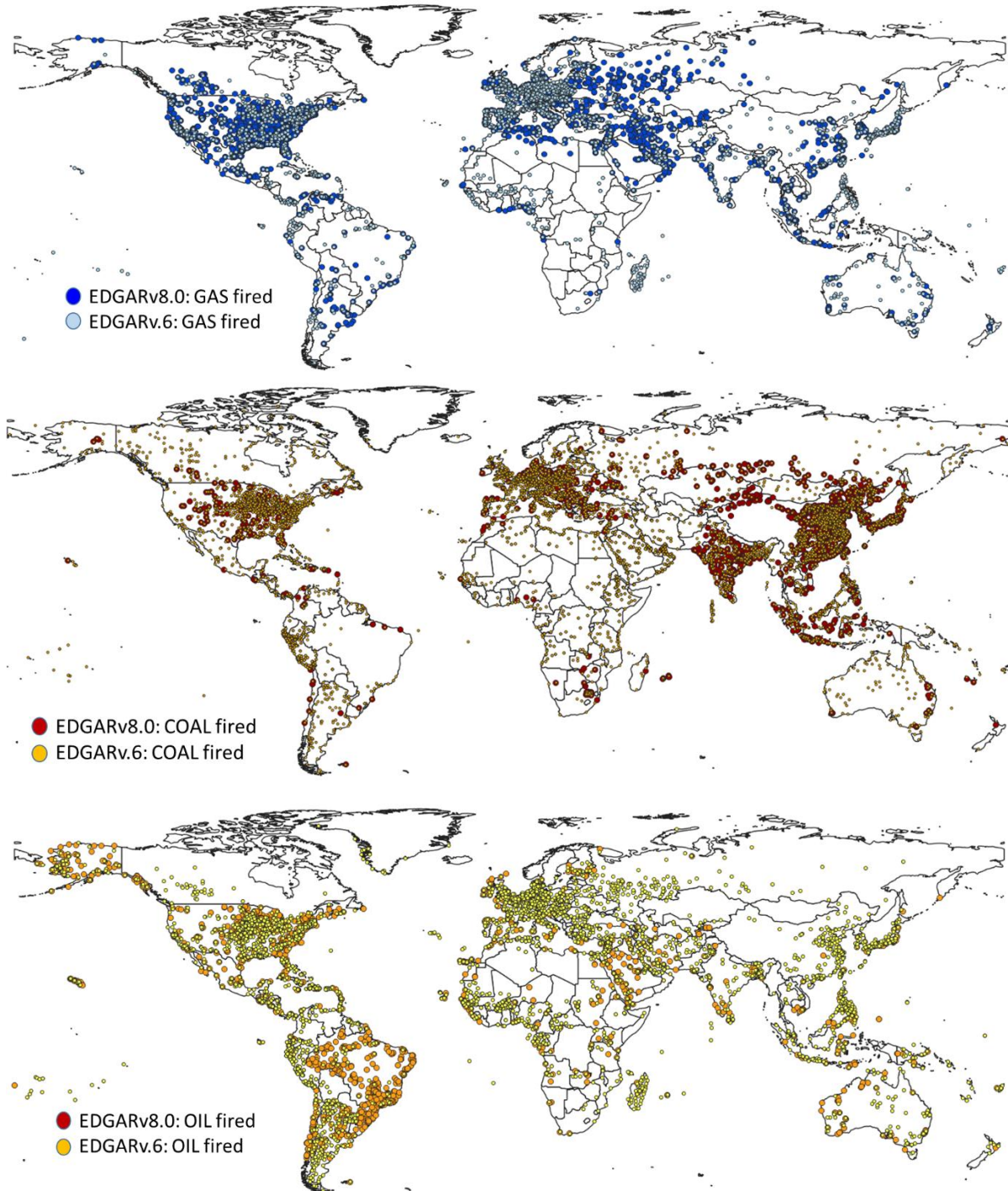
Figure S1 – Global coverage of fossil fuel fired power plants in EDGARv8.0 compared to EDGARv7.0.
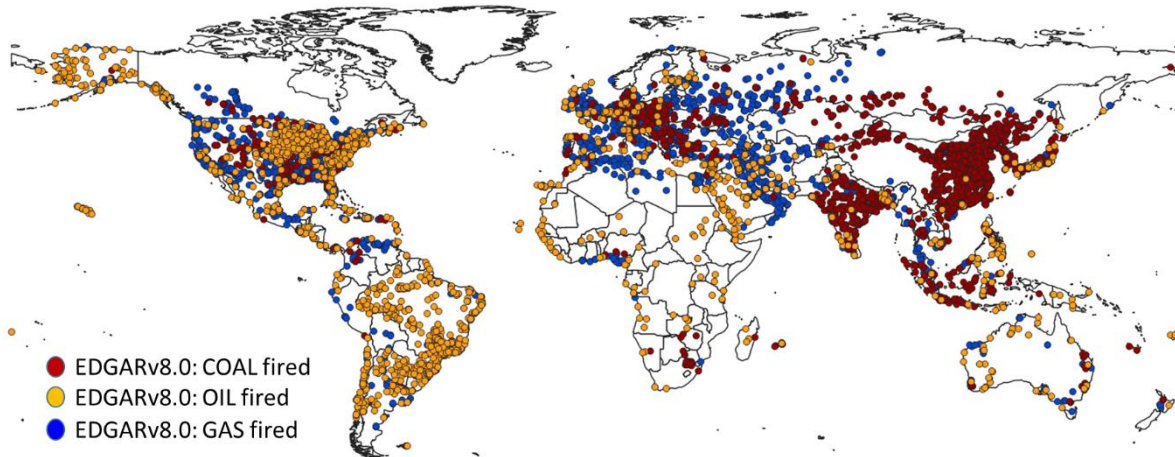
Figure S2 – Global coverage of power plants by fuel type in EDGARv8.0.
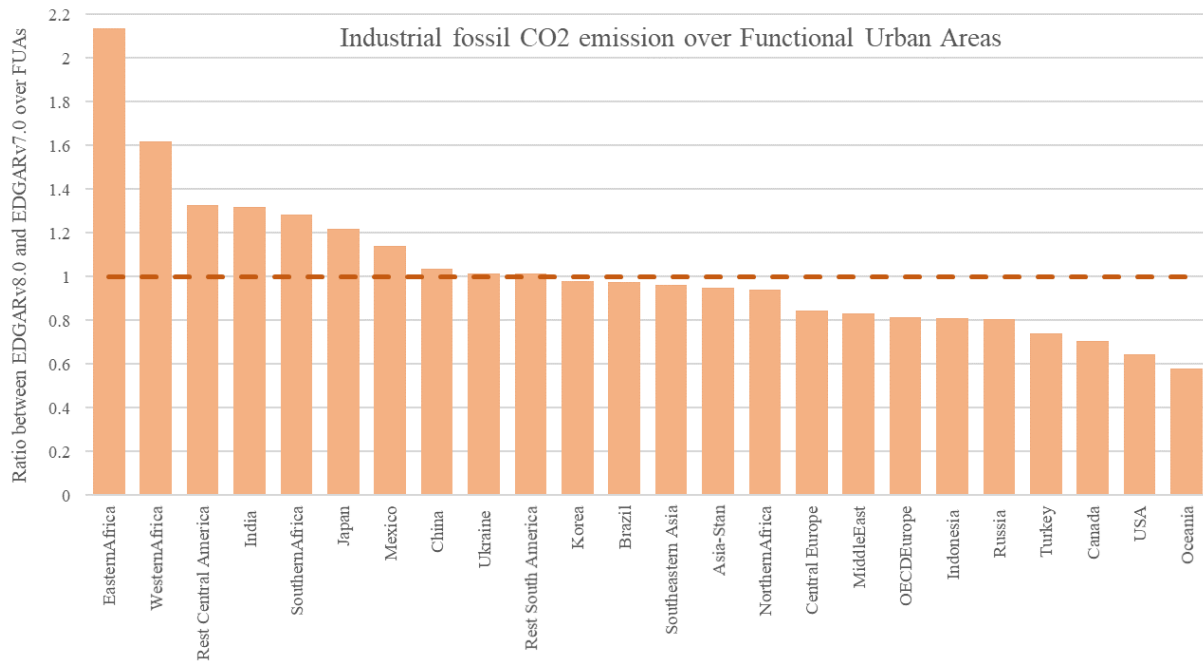
Figure S3 – Ratio between EDGARv8.0 and EDGARv7.0 of industrial fossil CO2 emissions in 2022 happening over global Functional Urban Areas (FUAs).

Figure S4 – International shipping CO2 emission maps (2022) using EDGARv5 and EDGARv8 spatial proxies.
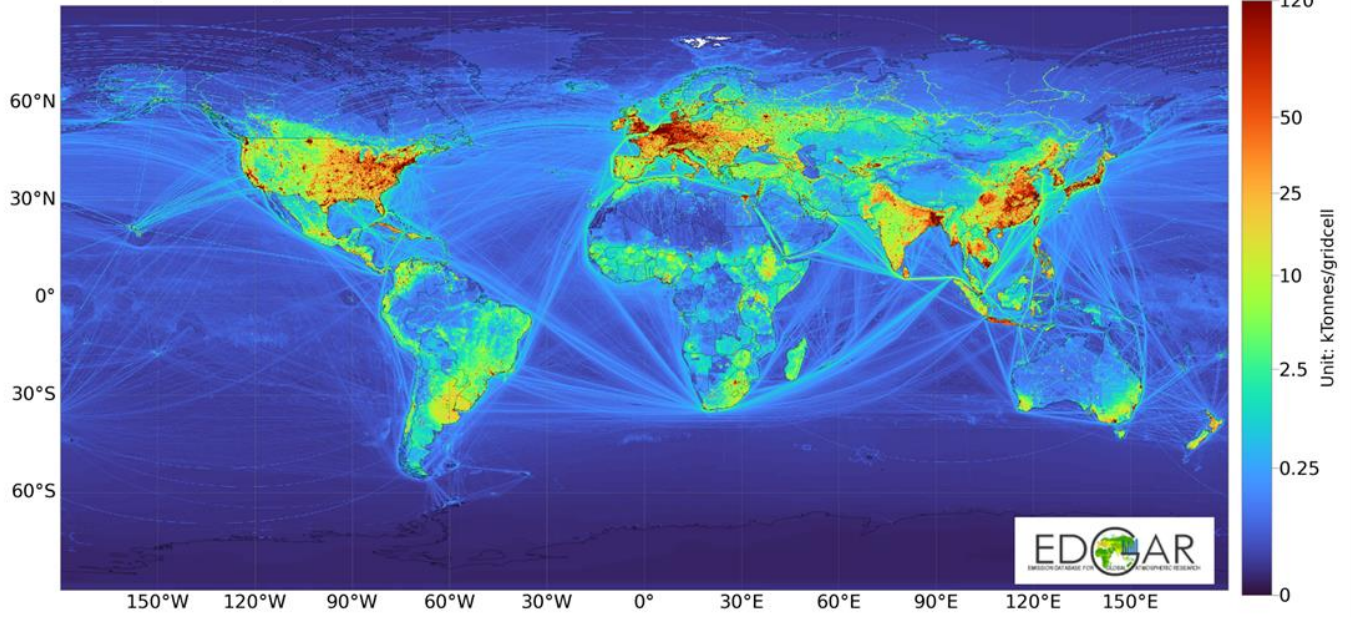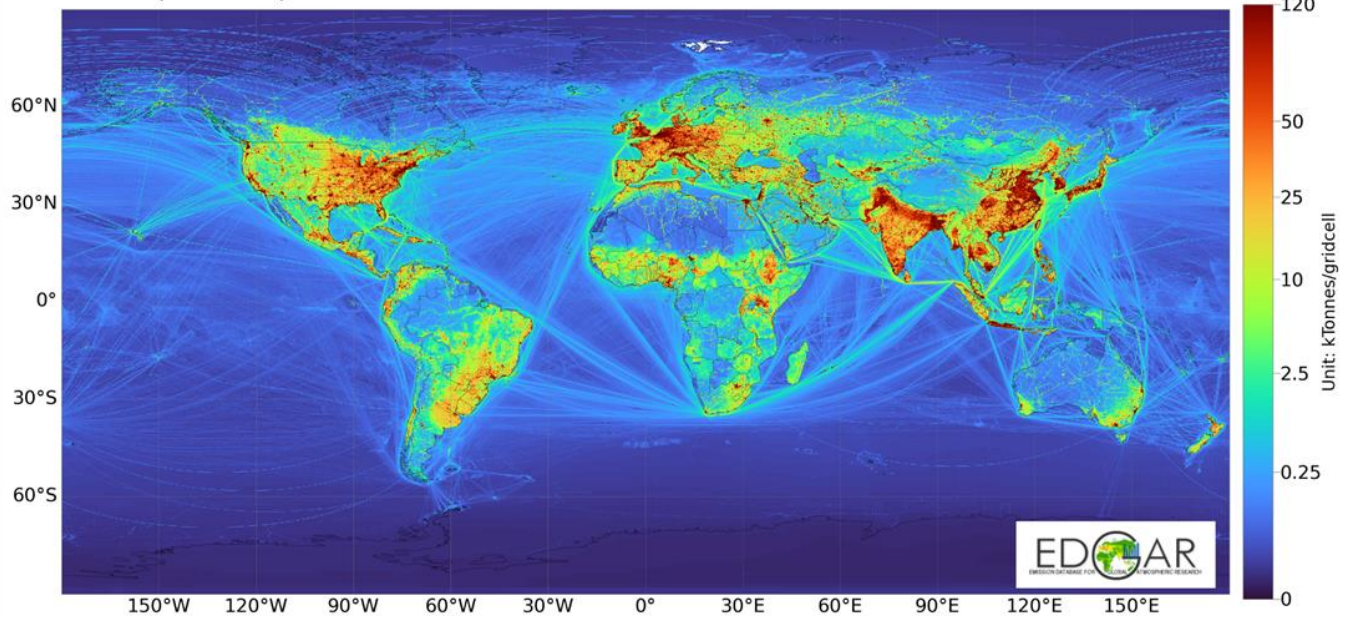
Figure S5 – Evolution of global GHG emission maps from 1970 to 2022.
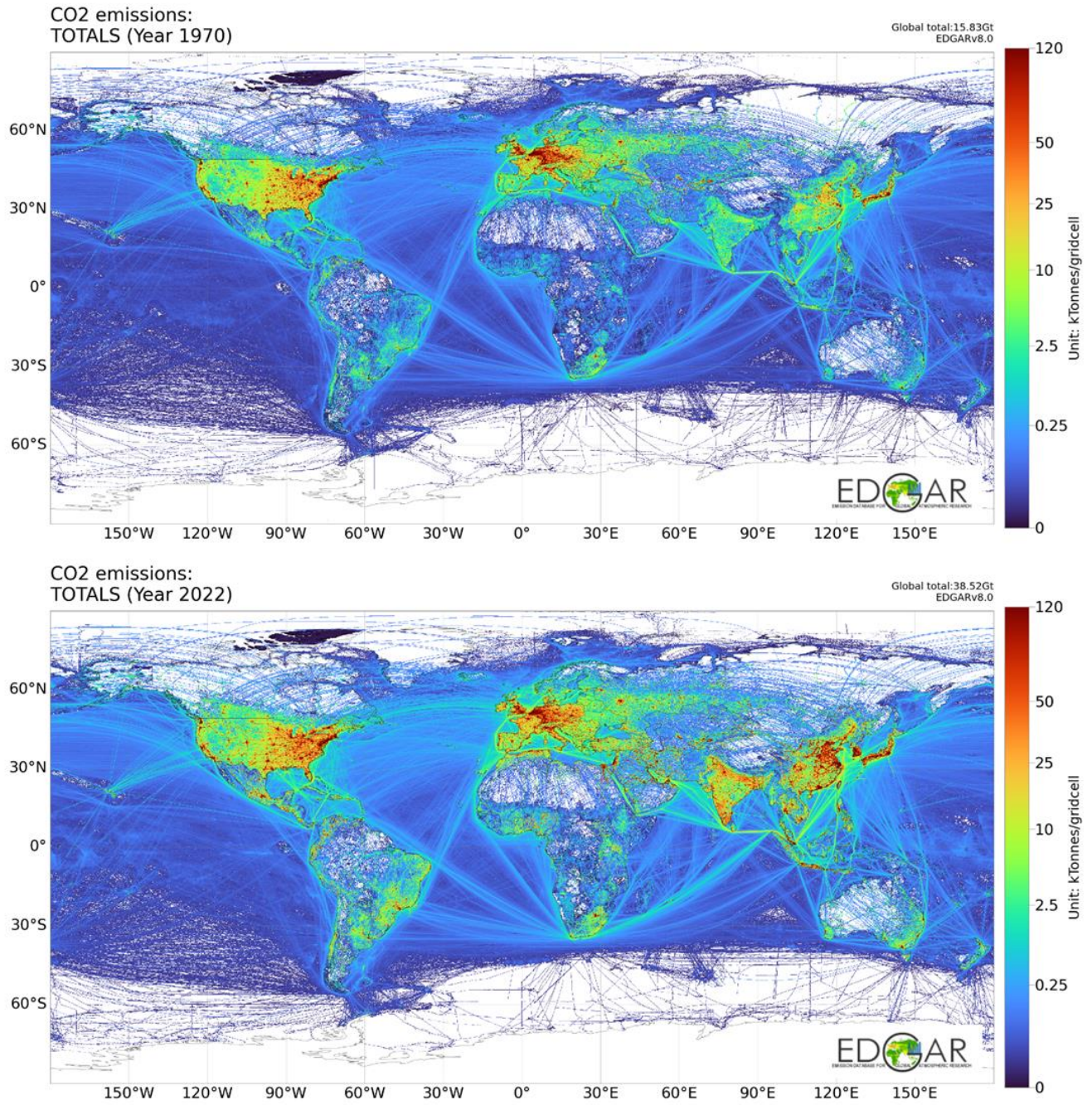
Figure S6 – Evolution of global fossil CO2 emission maps from 1970 to 2022.
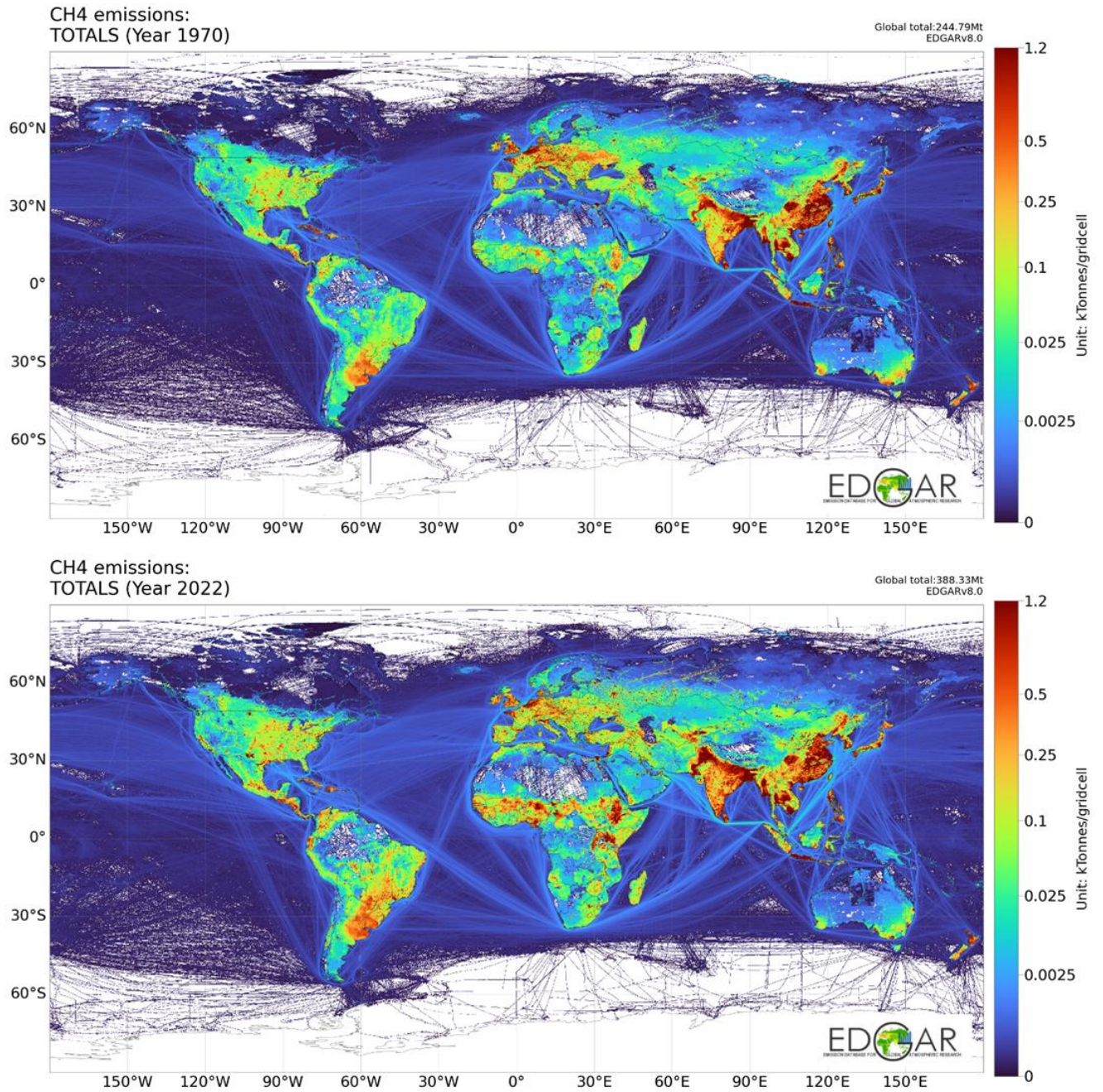
Figure S7 – Evolution of global CH4 emission maps from 1970 to 2022.
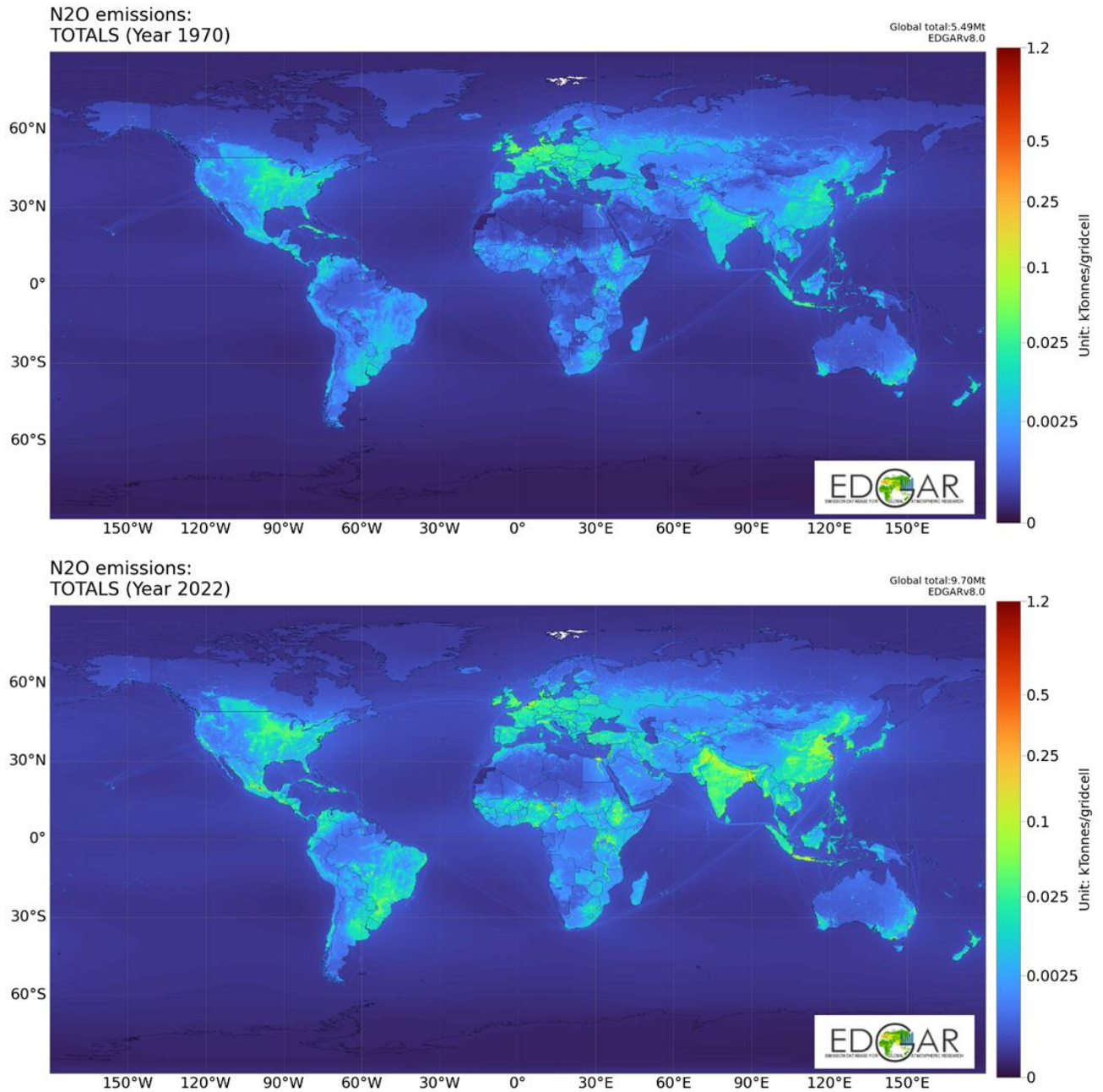
Figure S8 – Evolution of global N2O emission maps from 1970 to 2022.

References

Janssens-Maenhout, G., Crippa, M., Guizzardi, D., Muntean, M., Schaaf, E., Dentener, F., Bergamaschi, P., Pagliari, V., Olivier, J. G. J., Peters, J. A. H. W., van Aardenne, J. A., Monni, S., Doering, U., Petrescu, A. M. R., Solazzo, E., and Oreggioni, G. D.: EDGAR v4.3.2 Global Atlas of the three major greenhouse gas emissions for the period 1970–2012, Earth Syst. Sci. Data, 11, 959-1002, 10.5194/essd-11-959-2019, 2019.