Supplement Tables

Table S1: Sector correspondence between CAMS-GLOB-ANT, EDGARv5 and CEDS sectors

CAMS-GLOB-ANTv5 sectors	EDGARv5 Sectors	CEDS sectors	Species
Power genseration (ENE)	ene	1A1a_Electricity-autoproducer	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
		1A1a_Electricity-public	
		1A1a_Heat-production	
		1A5_Other-unspecified	
Refineries (REF)	ref_trf	1A1bc_Other-transformation	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NOx, OC, SO_2
Industrial processes (IND)	ind	1A2a_Ind-Comb-Iron-steel	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
		1A2b_Ind-Comb-Non-ferrous-metals	
		1A2c_Ind-Comb-Chemicals	
		1A2d_Ind-Comb-Pulp-paper	
		1A2e_Ind-Comb-Food-tobacco	
		1A2f_Ind-Comb-Non-metalic-minerals	
		1A2g_Ind-Comb-Construction	
		1A2g_Ind-Comb-machinery	
		1A2g_Ind-Comb-mining-quarrying	
		1A2g_Ind-Comb-other	
		1A2g_Ind-Comb-textile-leather	
		1A2g_Ind-Comb-transpequip	
		1A2g_Ind-Comb-wood-products	
	nmm	2A1_Cement-production	CO_2_excluding_short_cycle, BC, CO, NH_3, NMVOCs, SO_2
		2A2_Lime-production	
		2Ax_Other-minerals	
	che	2B_Chemical-industry	CO_2_excluding_short_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
		2B2_Chemicals-Nitric-acid	
		2B3_Chemicals-Adipic-acid	
		2D_Chemical-products-manufacture-processing	
	iro	2C_Metal-production	CO_2_excluding_short_cycle, CH_4, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
	foo_pap	2H_Pulp-and-paper-food-beverage-wood	BC, CO, NMVOCs, NO_x, SO_2

	nfe	Not in CEDS	CO_2_excluding_short_cycle, BC, CO, NO_x, SO_2
Road transportation (TRO)	tro_res	1A3b_Road	BC, OC
	tro_nores	1A3b_Road	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
Non-road transportation (TNR)	tnr_other	1A3c_Rail	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
		1A3eii_Other-transp	
Ships (SHP)	tnr_ship	1A3di_Oil_Tanker_Loading	CO_2_excluding_short_cycle, CH_4, BC, CO, NMVOCs, NO_x, OC, SO_2
		1A3dii_Domestic-navigation	
Residential (RCO)	rco	1A4a_Commercial-institutional	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
		1A4b_Residential	
Fugitives emissions from fuels (FEF)	fff	7A_Fossil-fuel-fires	CO_2_excluding_short_cycle, CH_4, N_2O, BC, CO, NMVOCs, NO_x, OC, SO_2
	pro	1B1_Fugitive-solid-fuels	CO_2_excluding_short_cycle, CH_4, N_2O, BC, CO, NMVOCs, NO_x, OC, SO_2
		1B2_Fugitive-petr	
		1B2b_Fugitive-NG-distr	
		1B2b_Fugitive-NG-prod	
		1B2d_Fugitive-other-energy	
Fugitives emissions for methane (FEF_COAL, FEF_GAS, FEF_OIL)	pro_coal pro_oil pro_gas	1B1_Fugitive-solid-fuels	CH_4
		1B2_Fugitive-petr	
		1B2b_Fugitive-NG-distr	
		1B2b_Fugitive-NG-prod	
		1B2d_Fugitive-other-energy	
Solvents application and production (SLV)	pru_sol	2D_Degreasing-Cleaning	CO_2_excluding_short_cycle, N_2O, NH_3, NMVOCs
		2D_Other-product-use	
		2D_Paint-application	
Agriculture livestock (AGL)	mnm	3B_Manure-management	CH_4, N_2O, NH_3, NMVOCs, NO_x
	enf	3E_Enteric-fermentation	
Agriculture soils (AGS)	ags	1A4c_Agriculture-forestry-fishing	CO_2_excluding_short_cycle, CH_4, N_2O, NH_3, NO_x
		3D_Rice-Cultivation	
		3D_Soil-emissions	
		3I_Agriculture-other	
	ide	7BC_Indirect-N2O-non-agricultural-N	
	swd_ldf	5A_Solid-waste-disposal	

Solid waste and wastewater handling (SWD)	swd_inc	5C_Waste-combustion	CO_2_excluding_short_cycle, CO_2_organic_cycle, CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
		5E_Other-waste-handling	
	wwt	5D_Wastewater-handling	NH_3, NMVOCs
Agriculture waste burning (AWB)	awb	Not in CEDS	CH_4, N_2O, BC, CO, NH_3, NMVOCs, NO_x, OC, SO_2
Indirect emissions from NOx and NH3 (DEP)	Ide	7BC_Indirect-N2O-non-agricultural	N_2O

Table S2: List of VOCs considered in the inventory and corresponding sectors

Name	Real name	ENE	RCO	TRO	TNR	FEF	SLV	AGR	SHP	SWD
voc1	Alcohols	X	X	X	X	X	X		X	X
voc2	Ethane	X	X	X	X	X	X	X	X	X
voc3	Propane	X	X	X	X	X	X	X	X	X
voc4	Butanes	X	X	X		X	X	X		X
voc5	Pentanes	X	X	X	X	X	X	X	X	X
voc6	Hexanes	X	X	X	X	X	X	X	X	X
voc7	Ethene	X	X	X	X	X	X	X	X	X
voc8	Propene	X	X	X	X	X	X	X	X	X
voc9	Ethyne	X	X	X	X	X	X	X	X	X
voc10	Isoprenes	X	X	X	X	X	X	X	X	X
voc11	Monoterpenes	X	X	X	X		X	X	X	X
voc12	Other alkadienes	X	X	X	X	X	X	X	X	X
voc13	Benzene	X	X	X	X	X	X	X	X	X
voc14	Methylbenzene	X	X	X	X	X	X	X	X	X
voc15	Dimethylbenzenes	X	X	X	X	X	X	X	X	X
voc16	Trimethylbenzenes	X	X	X	X	X	X	X	X	
voc17	Other aromatics	X	X	X	X	X	X	X	X	X
voc18	Esters	X	X	X	X	X	X		X	X
voc19	Ethers	X	X	X	X	X	X	X	X	X
voc20	Chlorinated	X	X	X	X	X	X		X	
voc21	Methanal	X	X	X	X	X	X	X	X	X
voc22	Other alkanals	X	X	X	X	X	X	X	X	X
voc23	Alkanones	X	X	X	X	X	X	X	X	
voc24	Acids	X	X	X	X		X		X	X
voc25	Others	X	X	X	X	X	X	X	X	X

Table S3: Altitude of the 25 levels (center of the altitude level) in CAMS-GLOB-AIR, the emissions from aircraft.

Altitude level	Altitude (km)
1	0.305
2	0.915
3	1.525
4	2.135
5	2.745
6	3.355
7	3.965
8	4.575
9	5.185
10	5.795
11	6.405
12	7.015
13	7.625
14	8.235
15	8.845
16	9.455
17	10.065
18	10.675
19	11.285
20	11.895
21	12.505
22	13.115
23	13.725
24	14.335
25	14.945

10 Table S4: This table indicates the global totals for 2 groups of sectors, transportation (sum of road and non-road transportation) and energy + industrial activities (sum of the sectors called power generation, refineries, industrial processes, fugitive and solvents) for the years 2000, 2012 and 2021, as well as the 2000-2012 and 2012-2021 changes.

	Transportation					Energy/industrial				
	2000	2012	2021	Change 2012-2000	Change 2021-2012	2000	2012	2021	Change 2012-2000	Change 2021-2012
CO_2 (excl)	5,480	6,559	7,157	+20%	+9%	16,525	24,561	25,370	+49%	+3%
CH_4	0.75	0.89	1.1	+19%	+21%	83.8	113.3	122.4	+35%	+8%
CO	265.5	186.2	169.1	-30%	-10%	70.6	114.9	113.1	+63%	-2%
NO_x	39.2	35.9	32.4	-9%	-10%	27.3	36.1	33.3	+32%	-8%
NMVOCs	29.0	28.5	26.9	-2%	-6%	60.7	78.1	81.8	+29%	+5%
SO_2	14.9	11.1	3.2	-26%	-70%	25.8	40.6	32.9	+57%	-19%
BC	0.69	0.67	0.54	-3%	-20%	1.35	2.23	1.97	+35%	-12%
OC	9.9	10.0	10.6	+1%	+6%	11.8	11.6	11.3	-2%	-3%
NH_3	0.49	0.71	0.72	+45%	+1%	1.59	2.13	2.23	+34%	+5%
Benzene	1.5	1.2	1.0	5.5	6.0	2.0	3.0	3.0	+48%	0%

Table S5: This table indicates the global totals for 2 sectors of groups of sectors, residential and and agriculture + waste (livestock, soils, waste burning and waste management) for the years 2000, 2012 and 2021, as well as the 2000-2012 and 2012-2021 changes.

	Residential					Agriculture + waste				
	2000	2012	2021	Change 2012-2000	Change 2021-2012	2000	2012	2021	Change 2012-2000	Change 2021-2012
CO_2 (excl)	3020	3230	3510	+7%	+9%	11.9	13.0	13.2	+9%	+1%
CH_4	12.2	12.8	13.0	+5%	+1.6%	204	231	240	+13%	+4%
CO	158	168	167	+6%	-1%	37.1	50.8	56.5	+37%	+11%
NO_x	3.24	3.53	3.6	+9%	+2%	2.97	3.61	3.74	+21%	+4%
NMVOCs	22.6	24.3	24.3	+7%	0%	9.5	11.9	12.7	+25%	+7%
SO_2	7.0	6.7	6.2	-4%	-7%	0.28	0.36	0.38	+28%	+5%
BC	1.49	1.54	1.59	+3%	+3%	0.27	0.36	0.39	+38%	+8%
OC	6.09	6.21	6.12	+2%	-2%	1.86	2.49	2.65	+34%	+6%
NH_3	3.40	3.72	3.88	+9%	+4%	35.4	42.2	42.7	+19%	+1%
Benzene	0.93	1.02	.90	+10%	-12%	0.56	0.70	0.69	+25%	-2%

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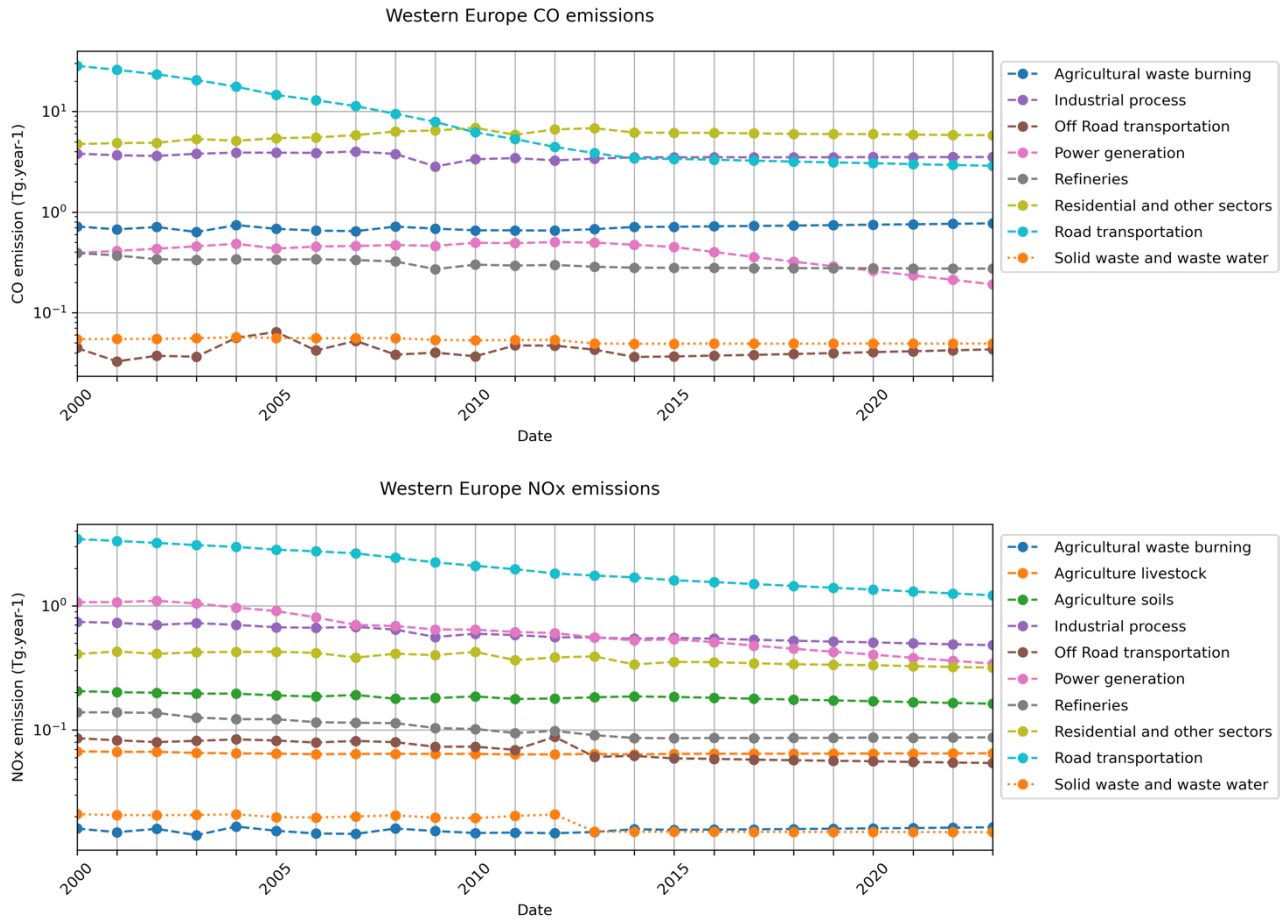
Figure S1: Changes in the CAMS-GLOB-ANT_v5.3 emissions of CO, NO_x, NMVOCs and SO_2 for the 2000-2023 period in Western Europe. In order to show the emissions for all sectors, a logarithmic scale is used.

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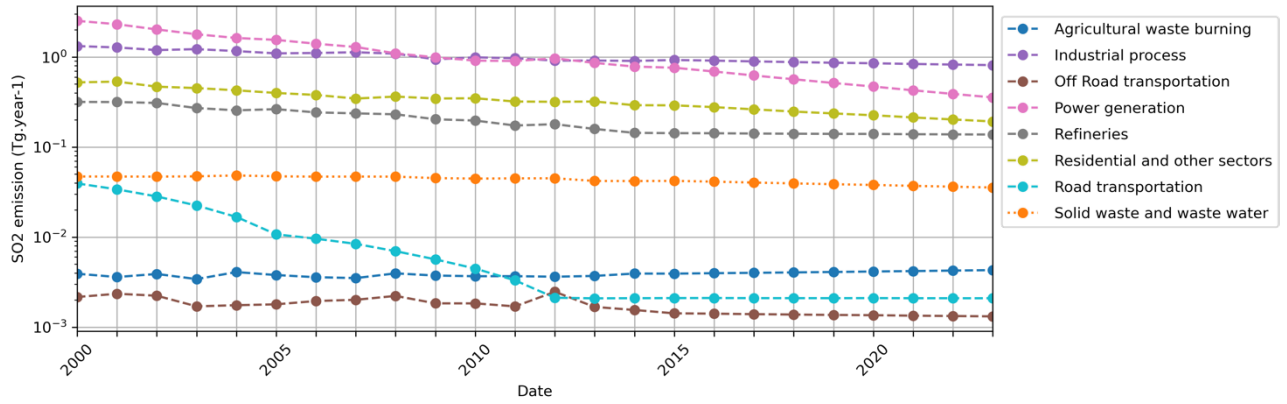
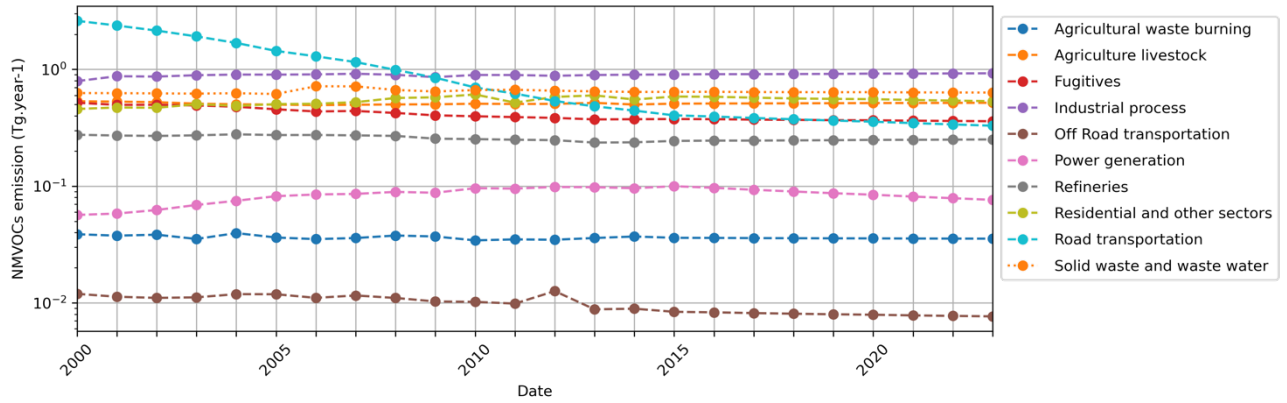
Western Europe SO2 emissions

Western Europe NMVOCs emissions

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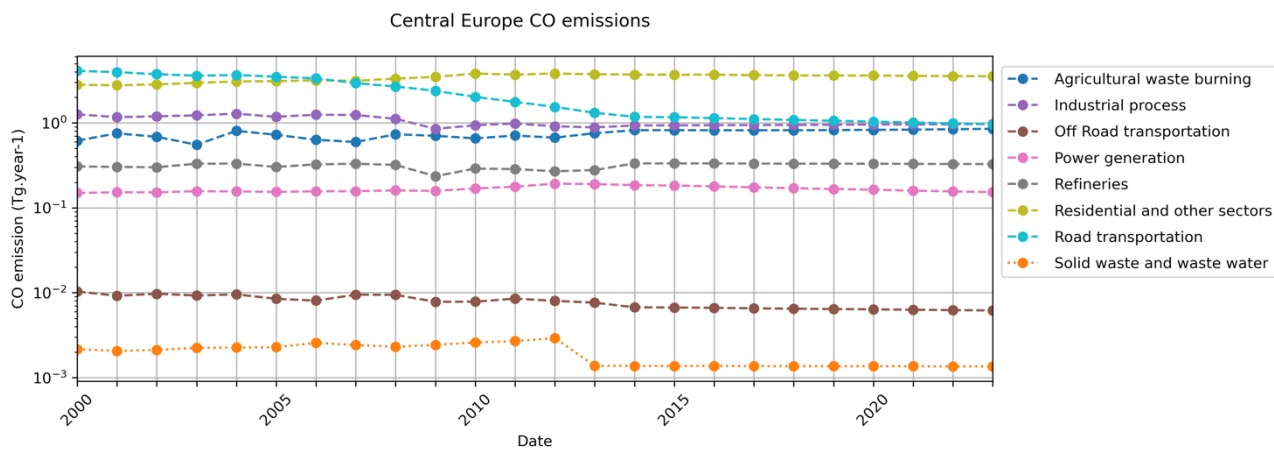
Figure S2: changes in the CAMS-GLOB-ANT_v5.3 emissions of CO, NO_x, NMVOCs and SO_2 for the 2000-2023 period in Central Europe. In order to show the emissions for all sectors, a logarithmic scale is used.

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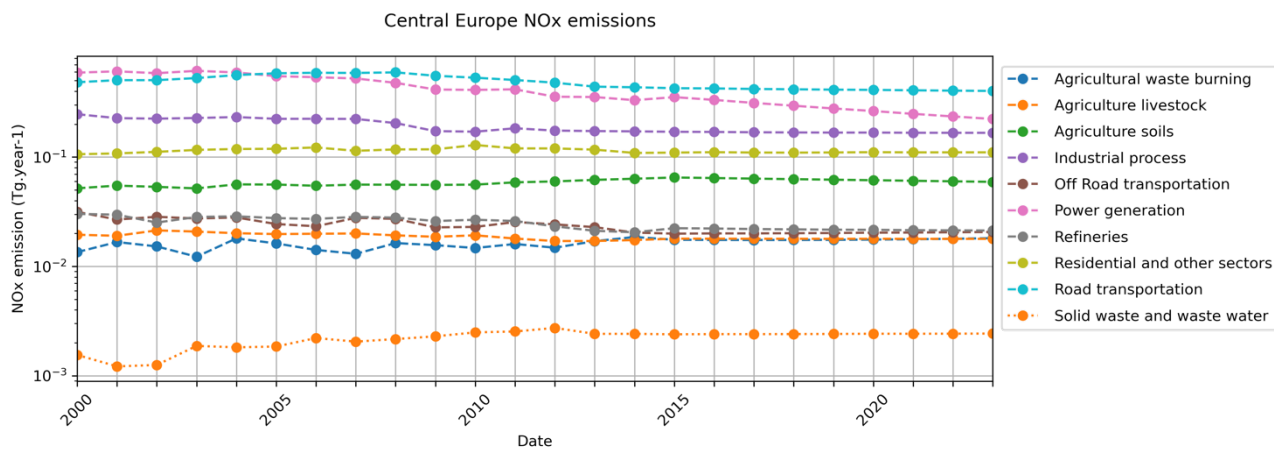

Central Europe NMVOCs emissions

Central Europe SO2 emissions

50

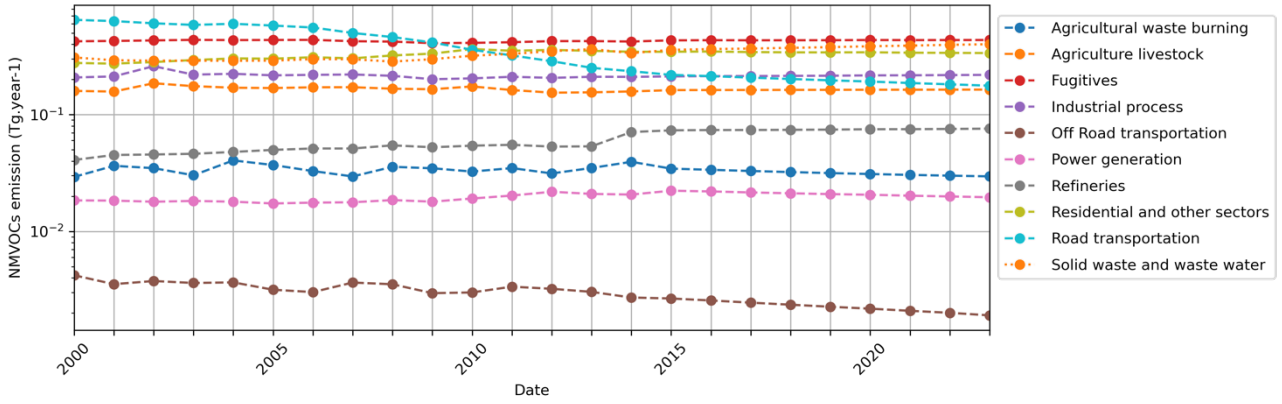
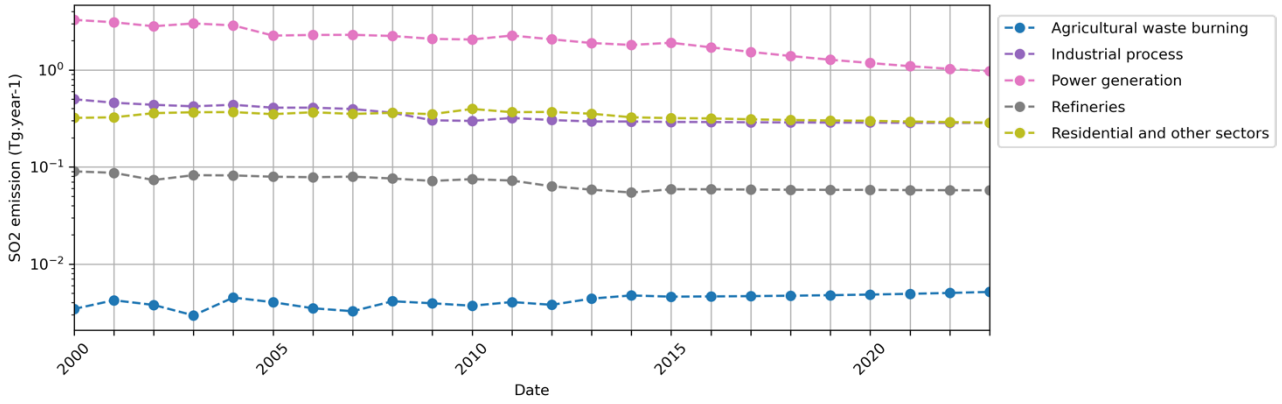
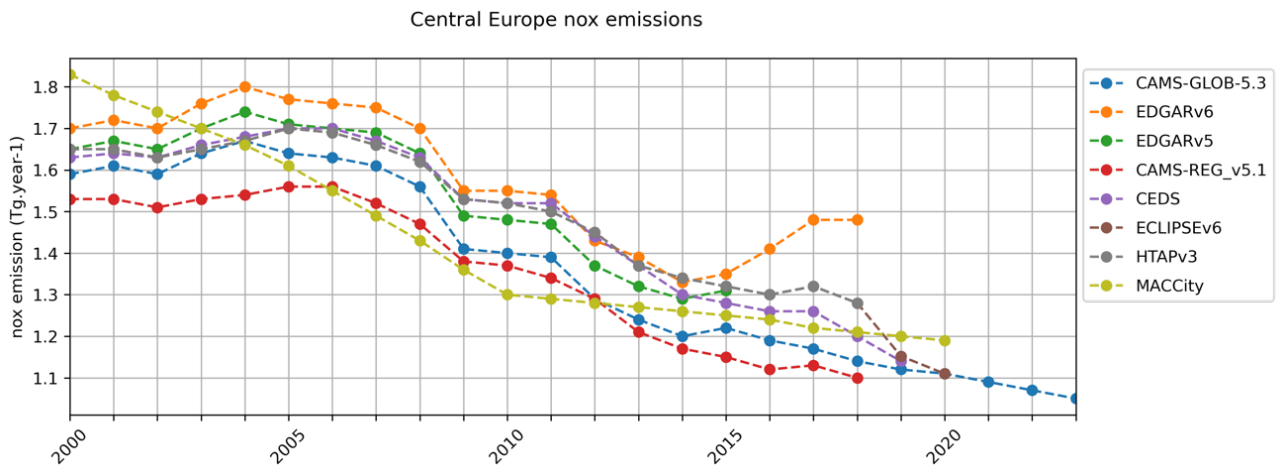
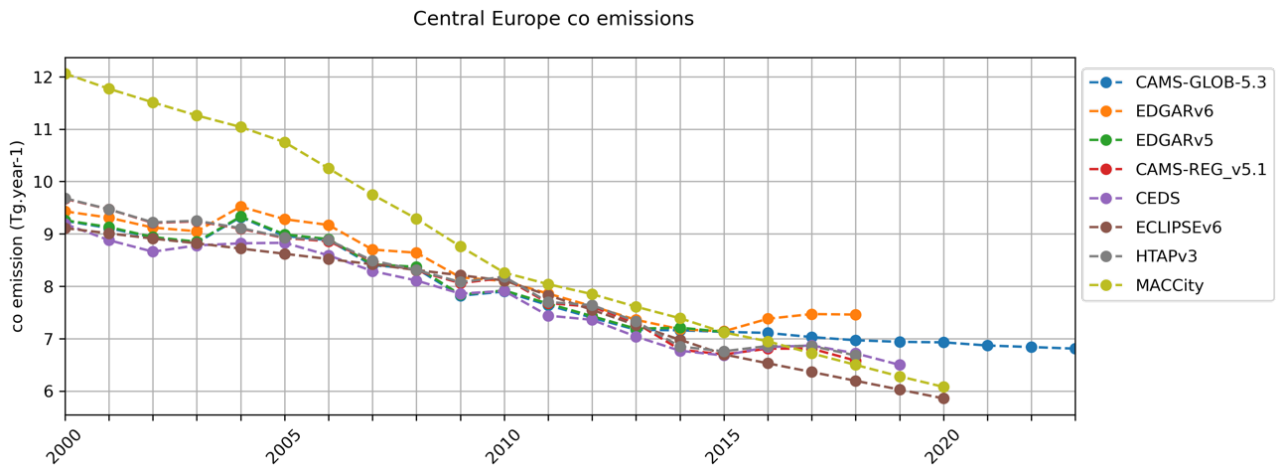
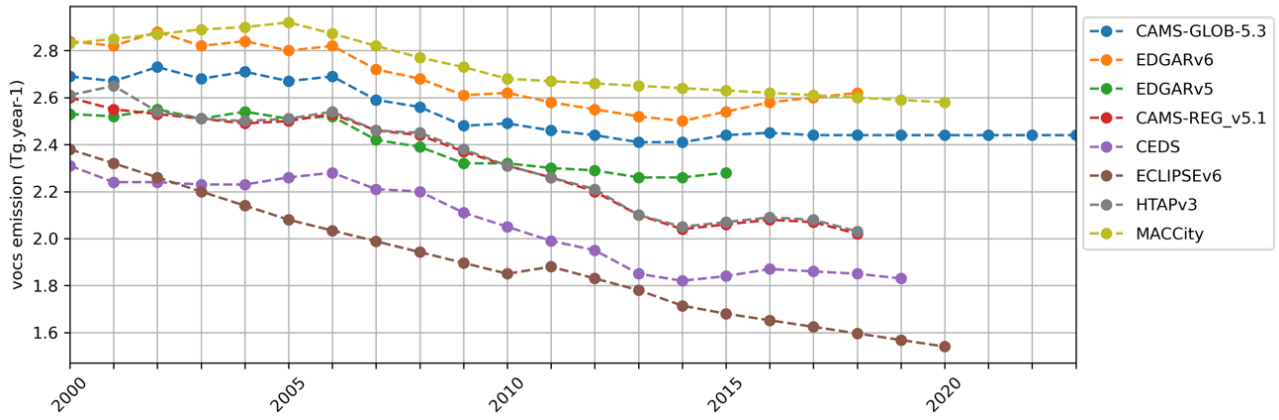



Figure S3: Comparisons of the CAMS-GLOB-ANT_v5.3 emissions with other global datasets and the CAMS-REG_V5.1 inventory for Central Europe.

Central Europe co emissions

Central Europe nox emissions

Central Europe vocs emissions

65

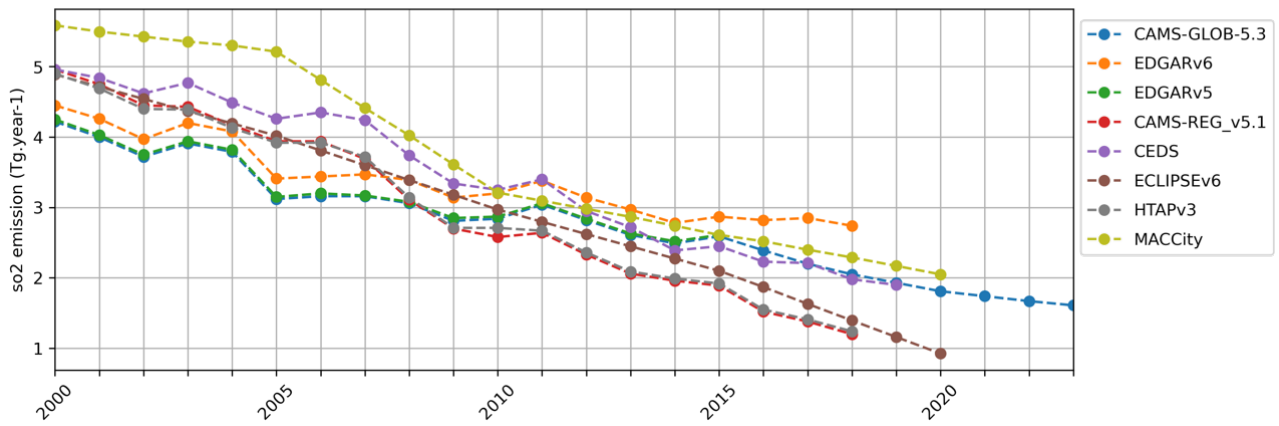
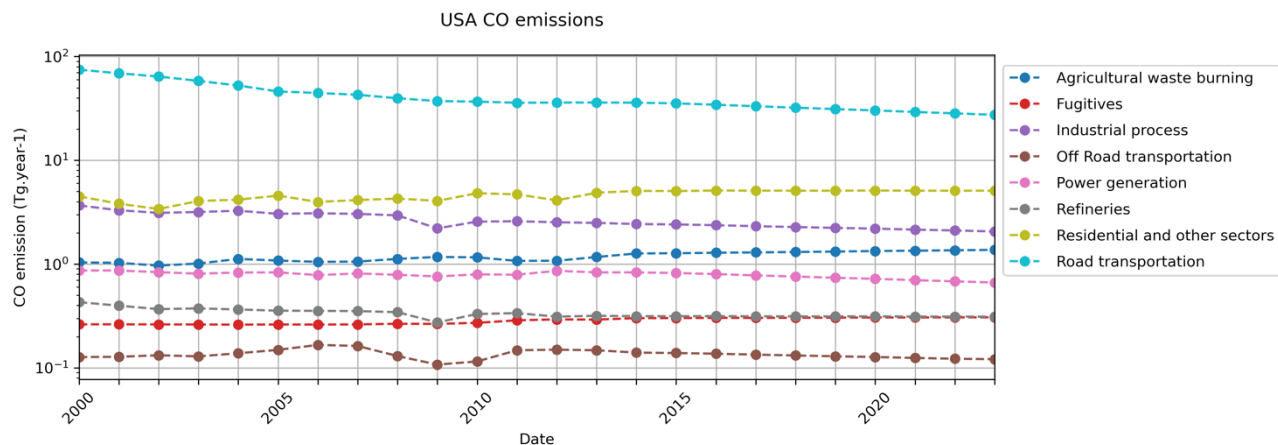
Central Europe so2 emissions

70

Figure S4: changes in the CAMS-GLOB-ANT_v5.3 emissions of CO, NO_x, NMVOCs and SO_2 for the 2000-2023 period in the USA. In order to show the emissions for all sectors, a logarithmic scale is used.

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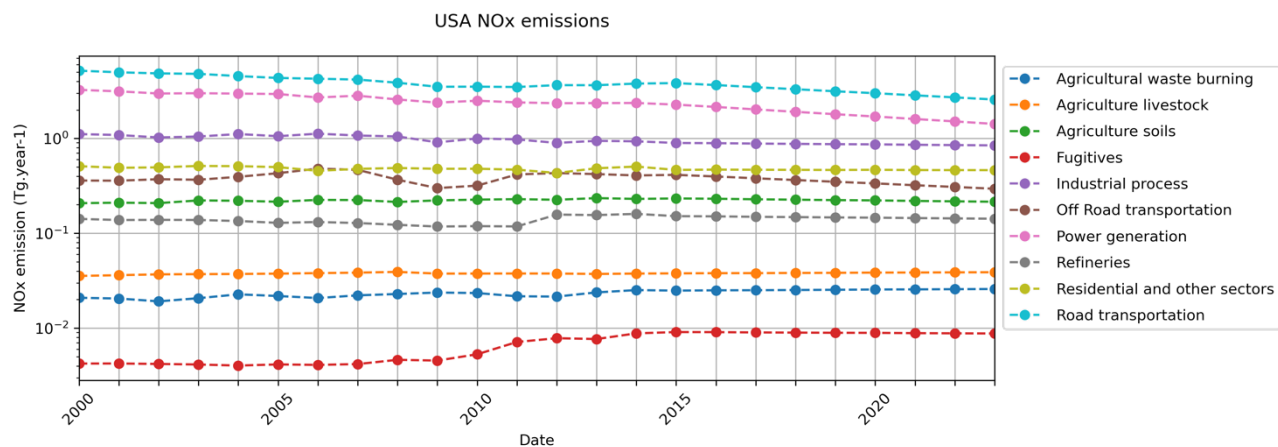
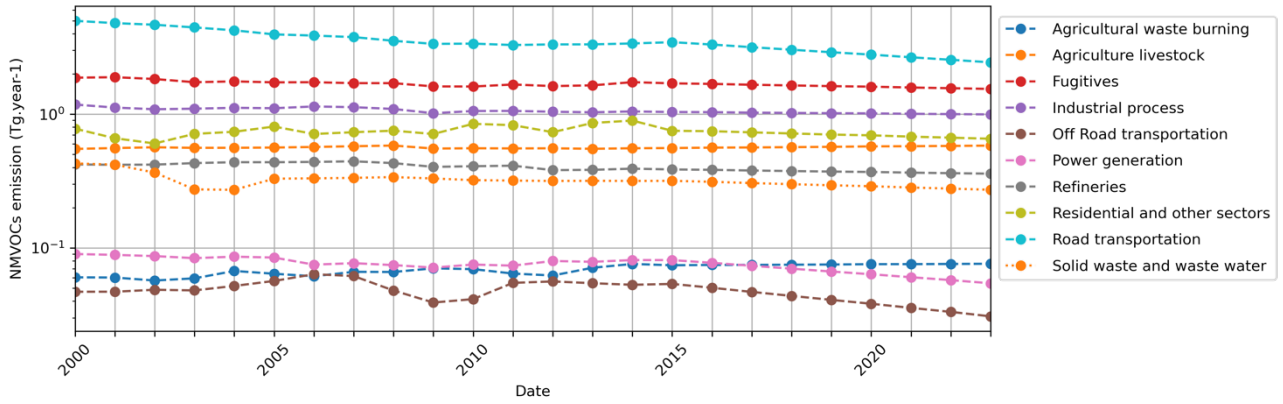
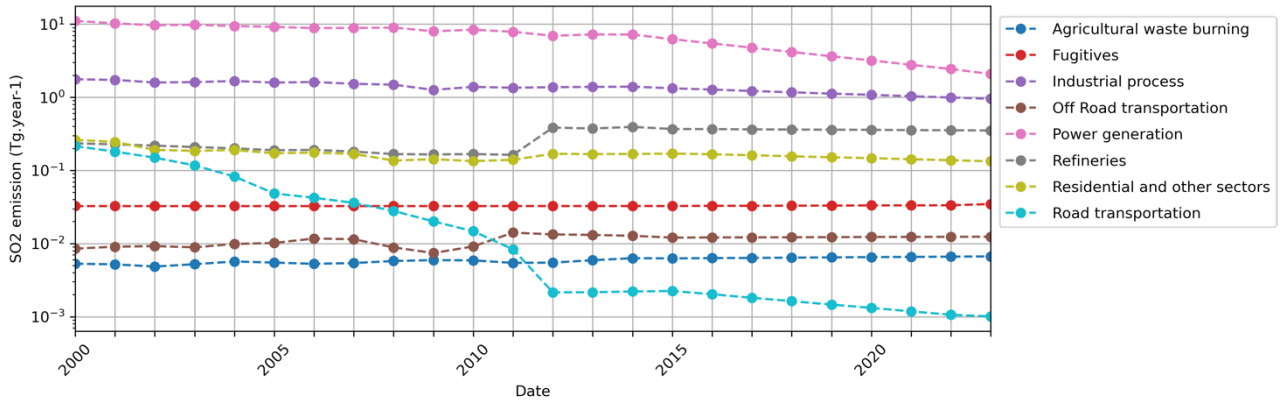

USA NMVOCs emissions

USA SO2 emissions

80

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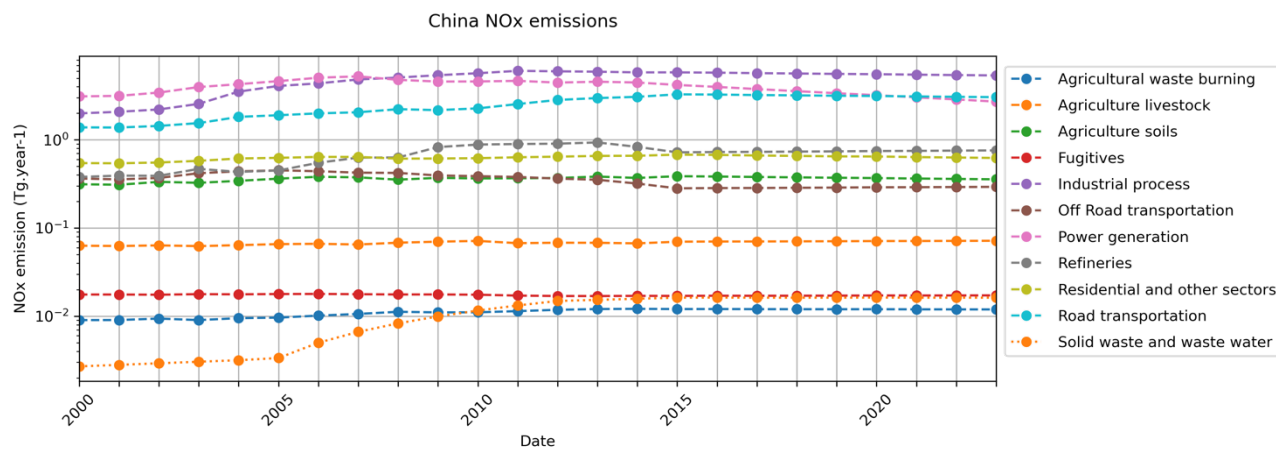
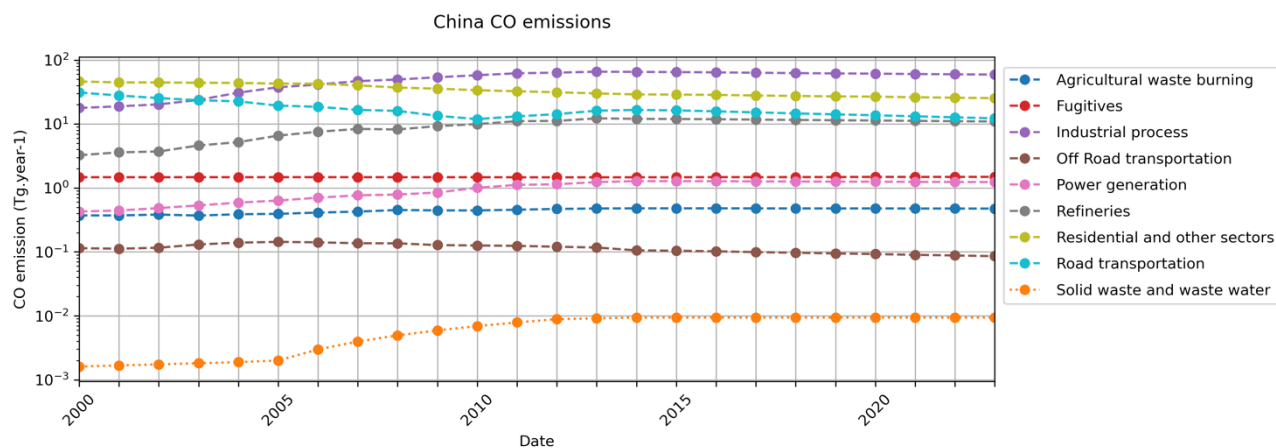
Figure S5: changes in the CAMS-GLOB-ANT_v5.3 emissions of CO, NO_x, NMVOCs and SO_2 for the 2000-2023 period in China. In order to show the emissions for all sectors, a logarithmic scale is used.

90

China CO emissions

China NOx emissions

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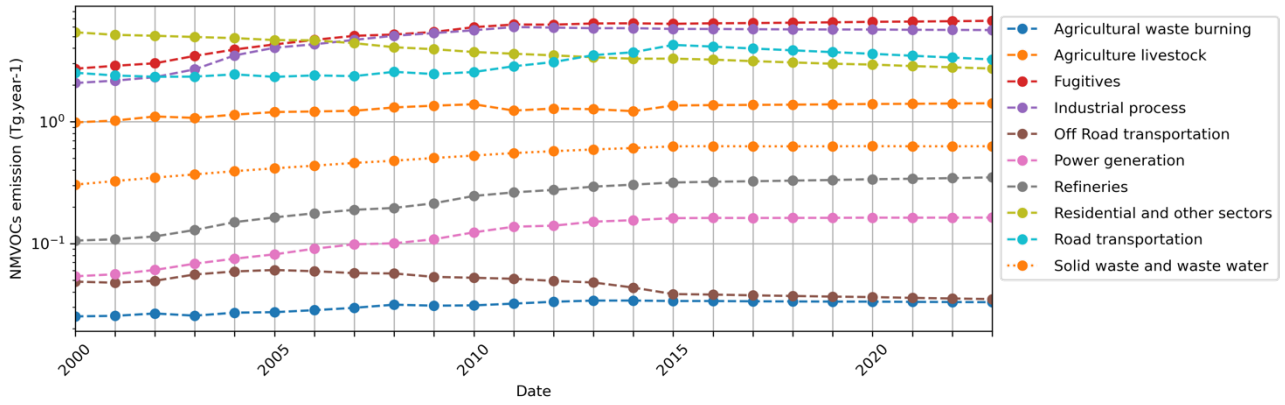
China NMVOCs emissions

China SO2 emissions

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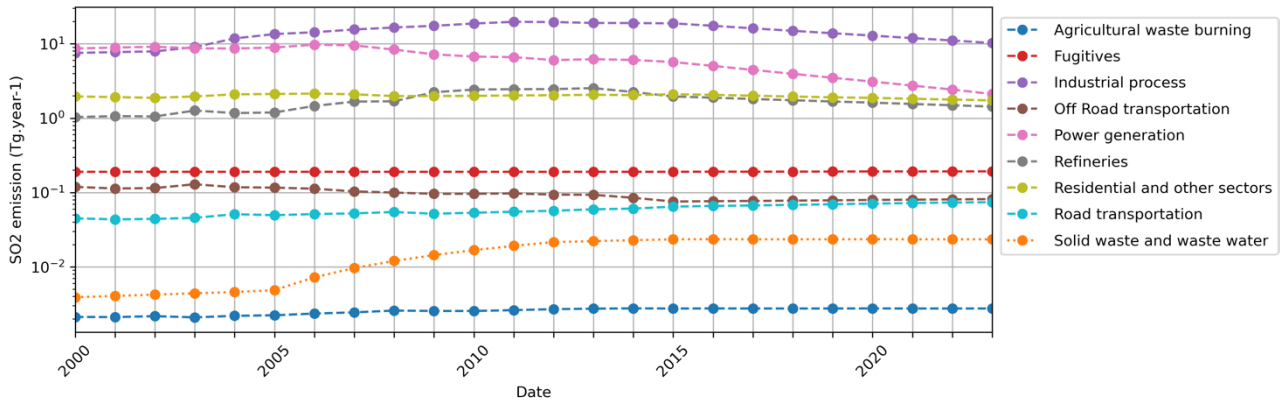
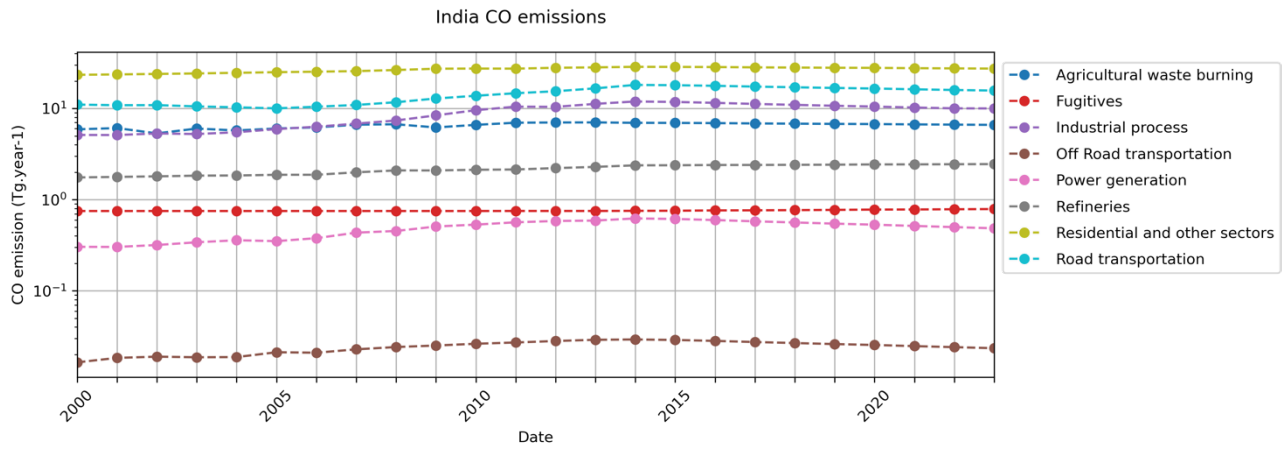
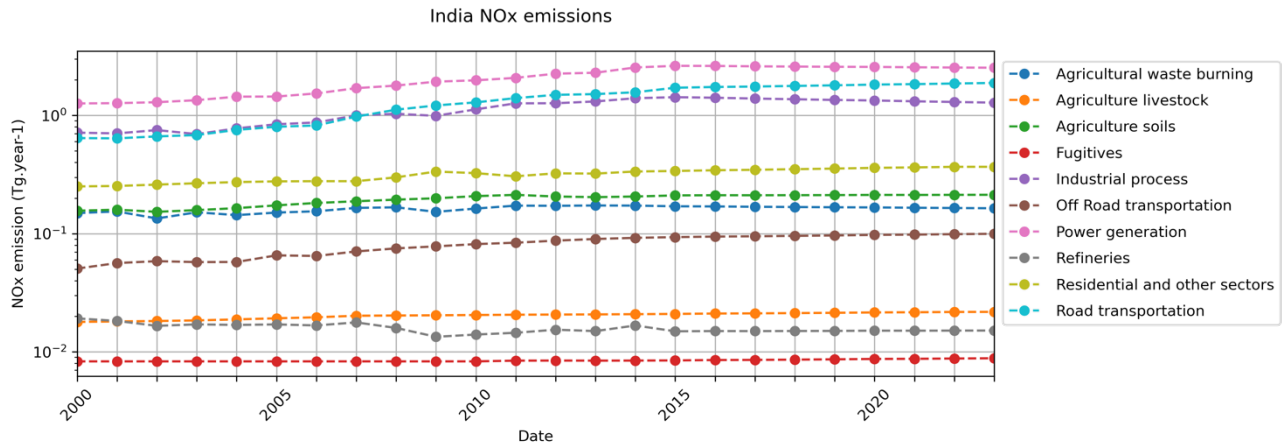


Figure S6: changes in the CAMS-GLOB-ANT_v5.3 emissions of CO, NO_x, NMVOCs and SO_2 for the
2000-2023 period in India. In order to show the emissions for all sectors, a logarithmic scale is used.

India CO emissions

India NOx emissions

India NMVOCs emissions

115

India SO2 emissions