

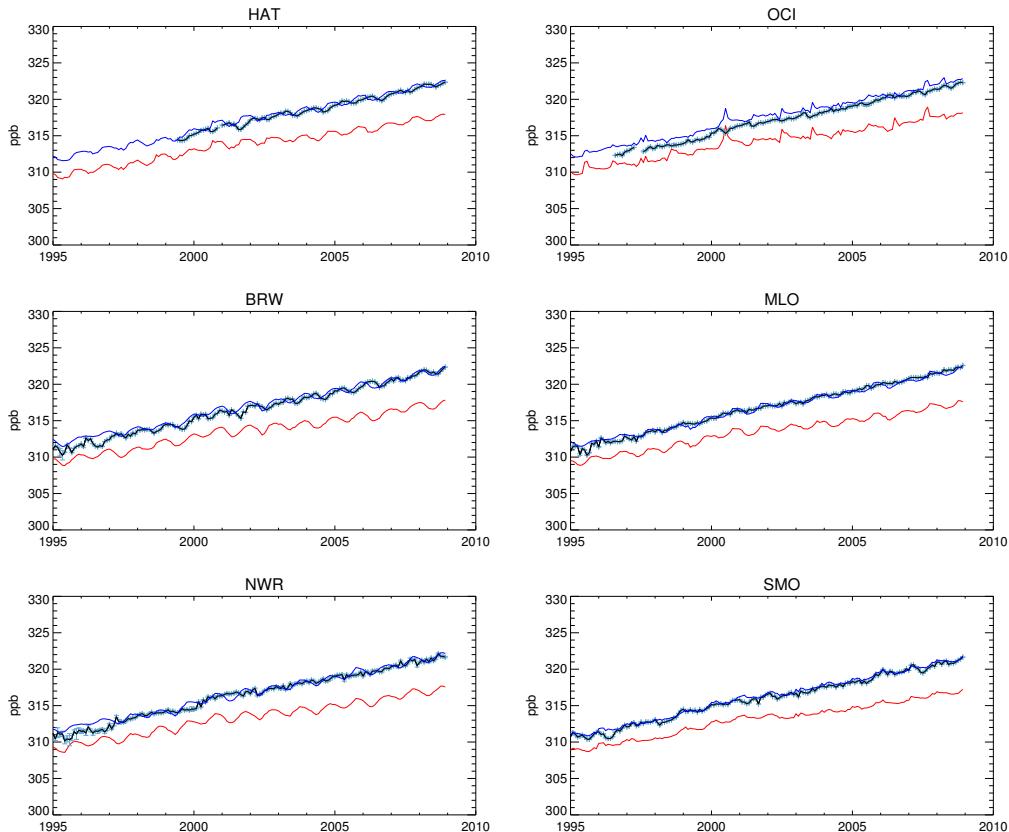


*Supplement of*

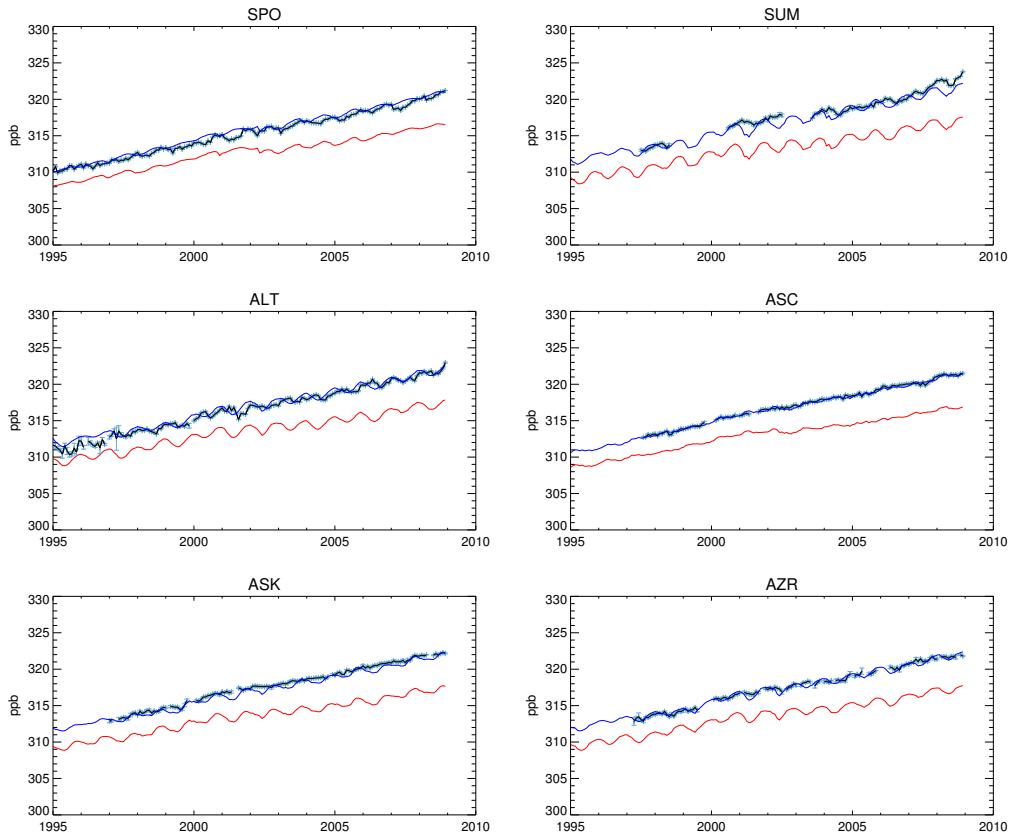
## **Global and regional emissions estimates for N<sub>2</sub>O**

**E. Saikawa et al.**

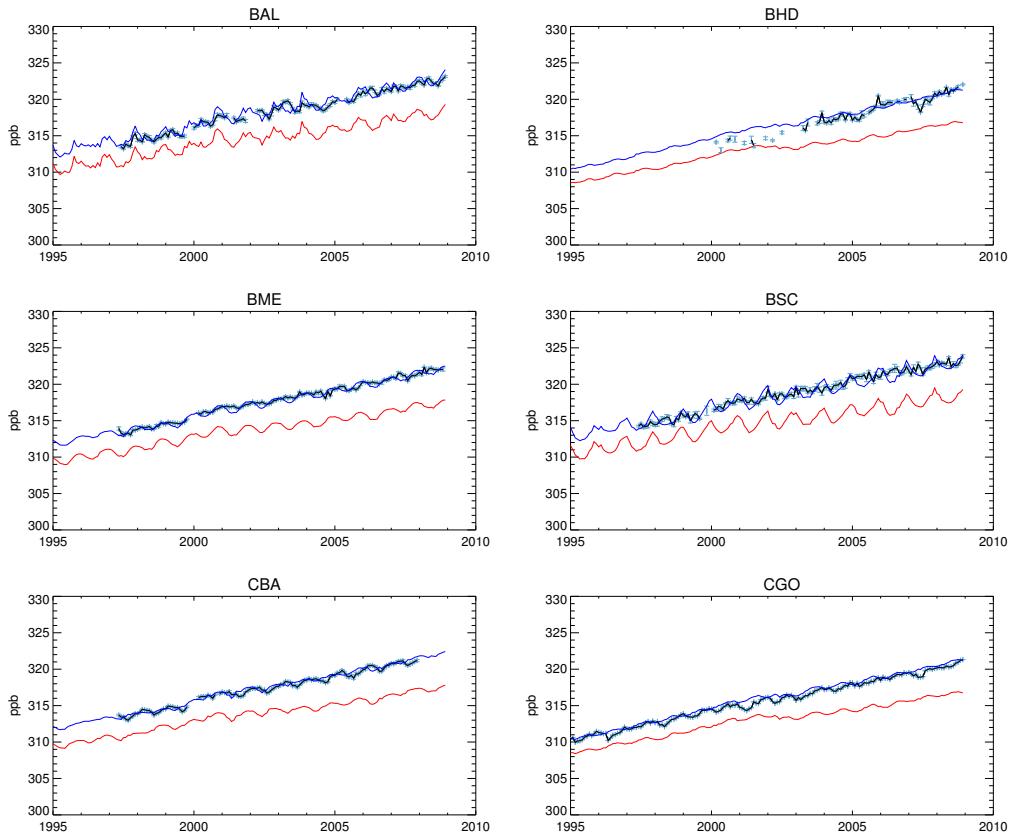
*Correspondence to:* E. Saikawa ([eri.saikawa@emory.edu](mailto:eri.saikawa@emory.edu))



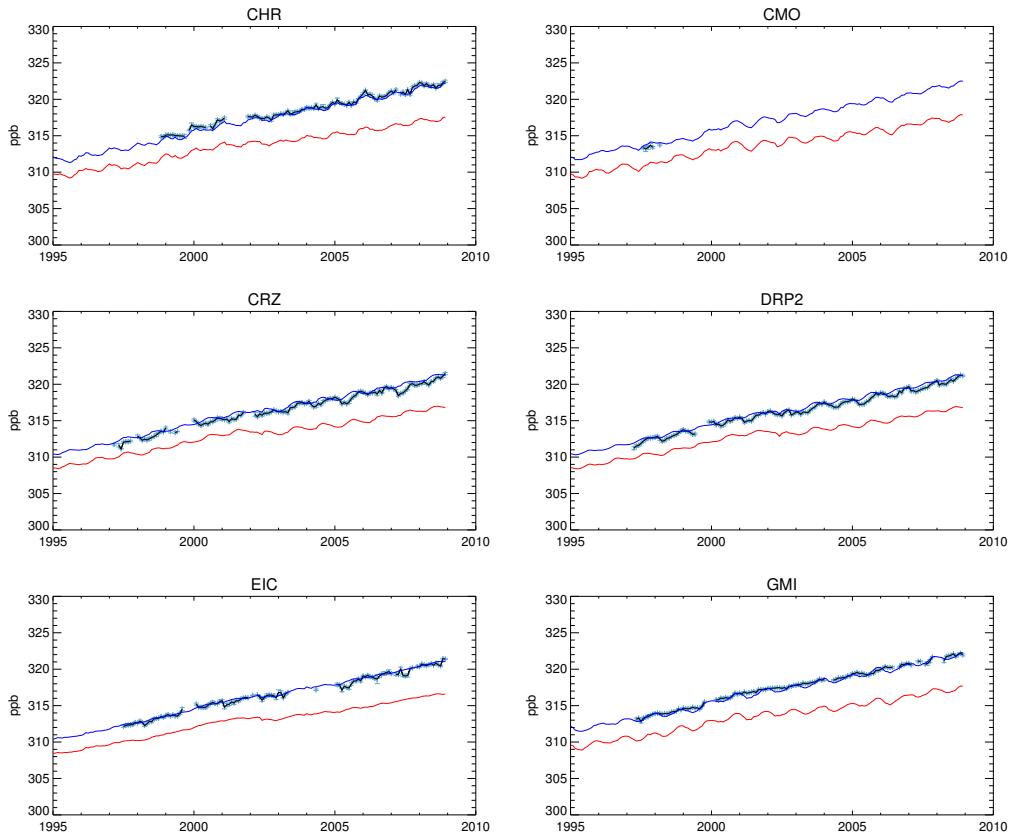
**Fig. S1a.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



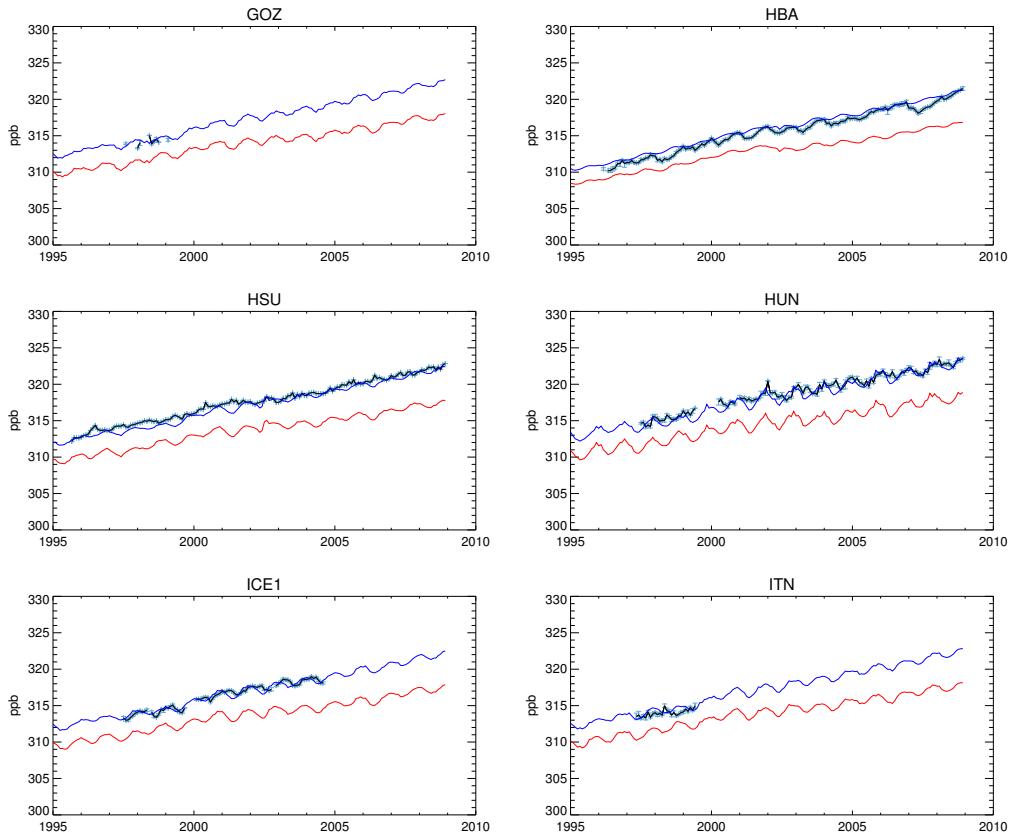
**Fig. S1b.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



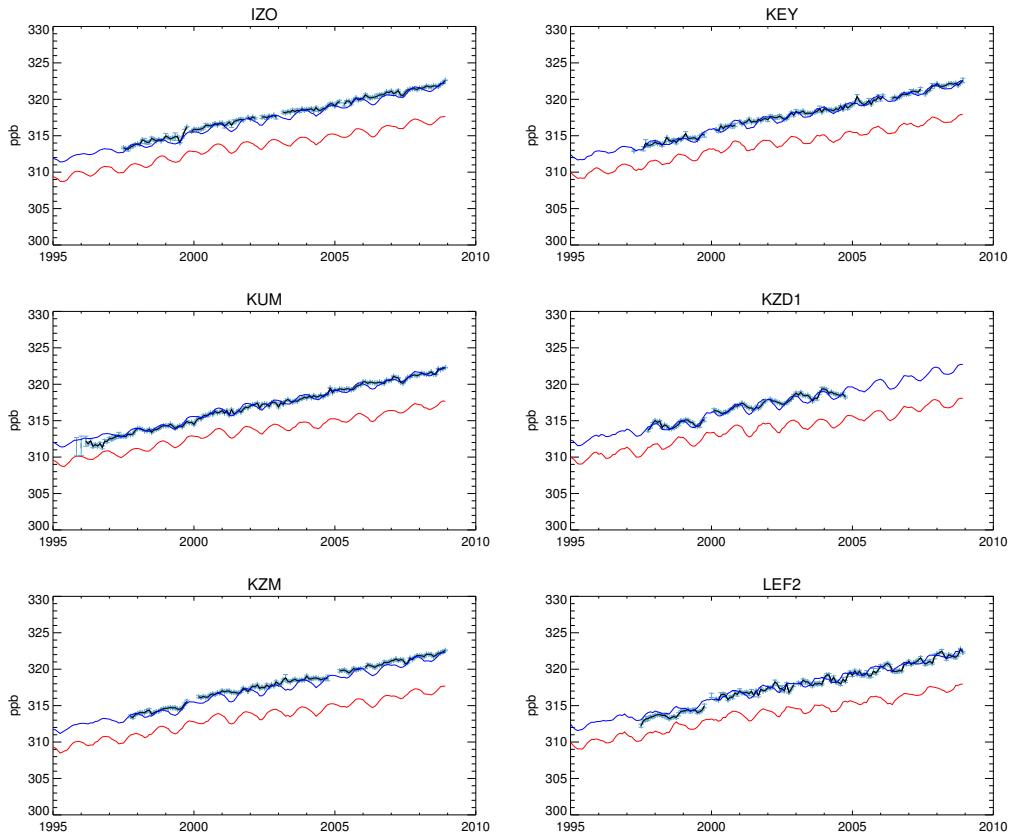
**Fig. S1c.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



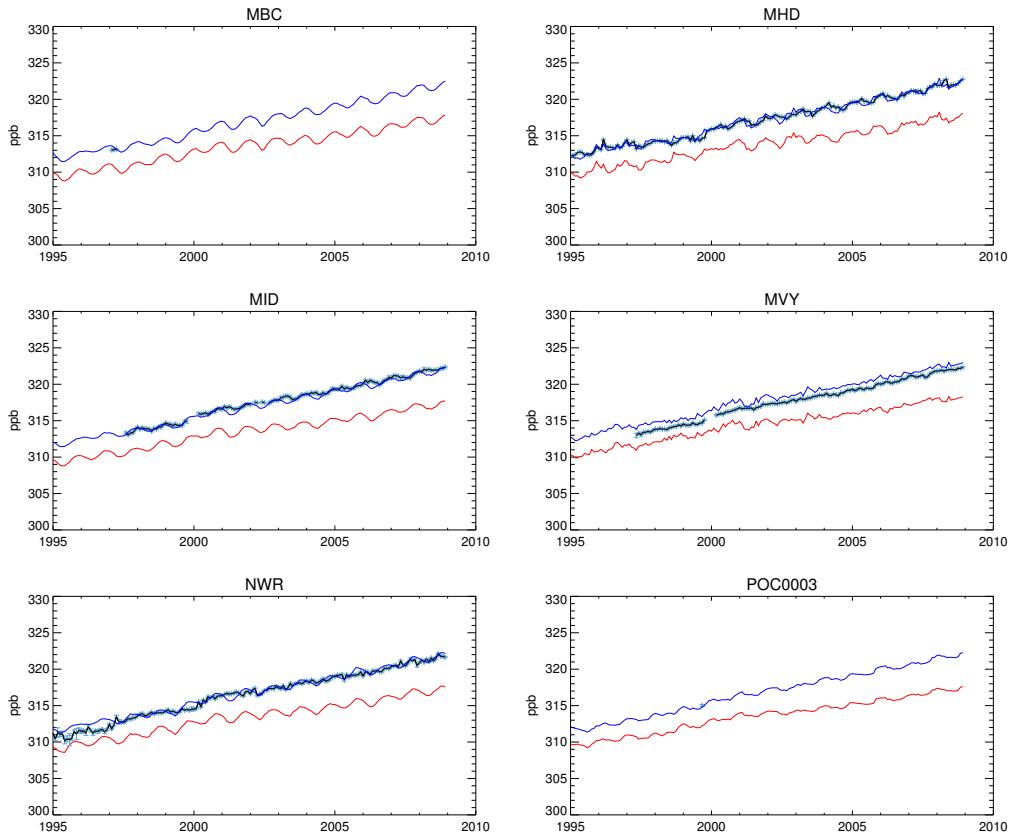
**Fig. S1d.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



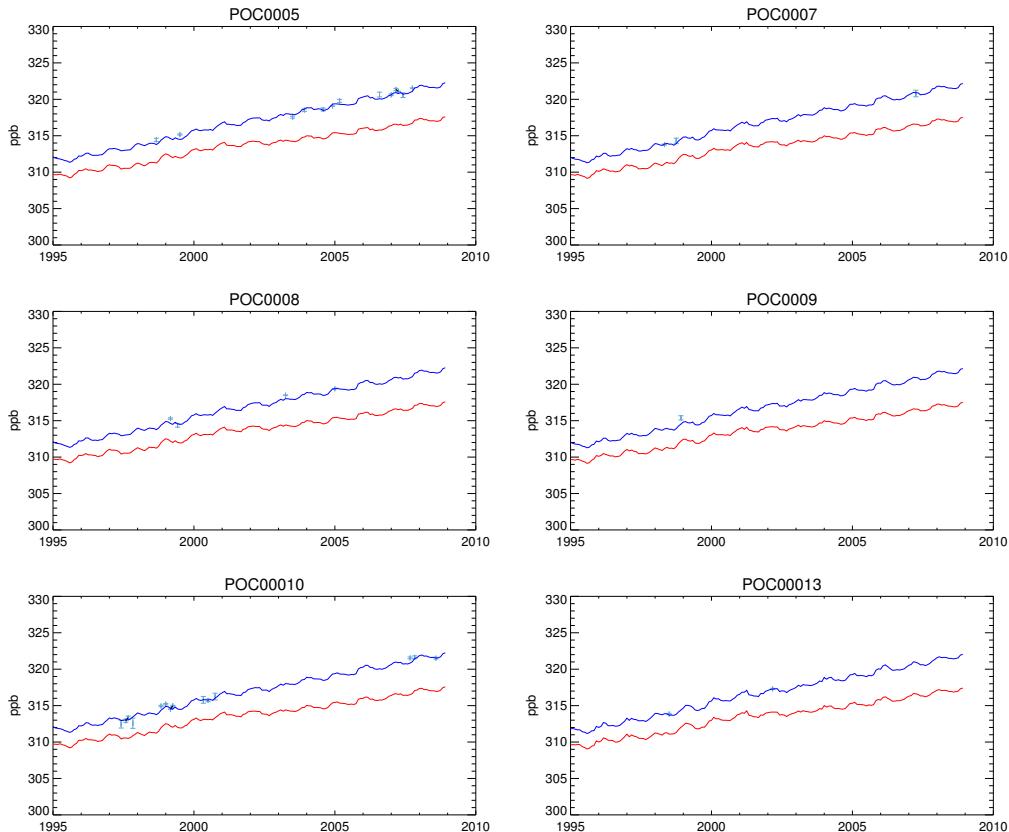
**Fig. S1e.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



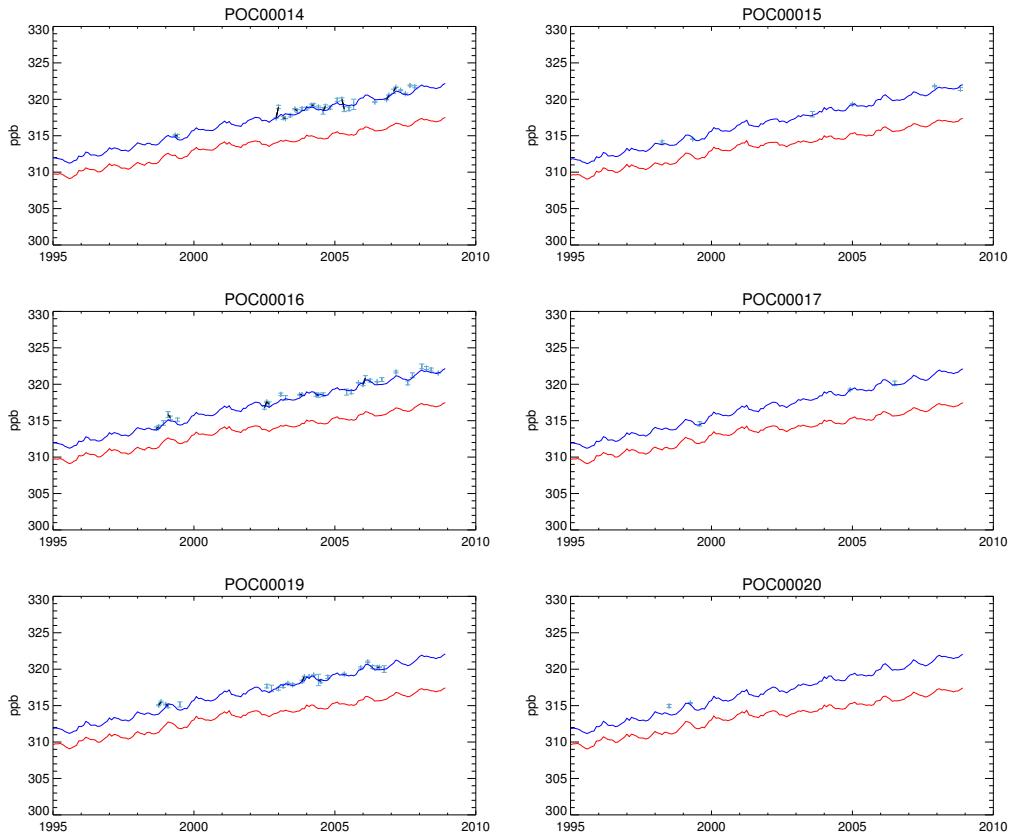
**Fig. S1f.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



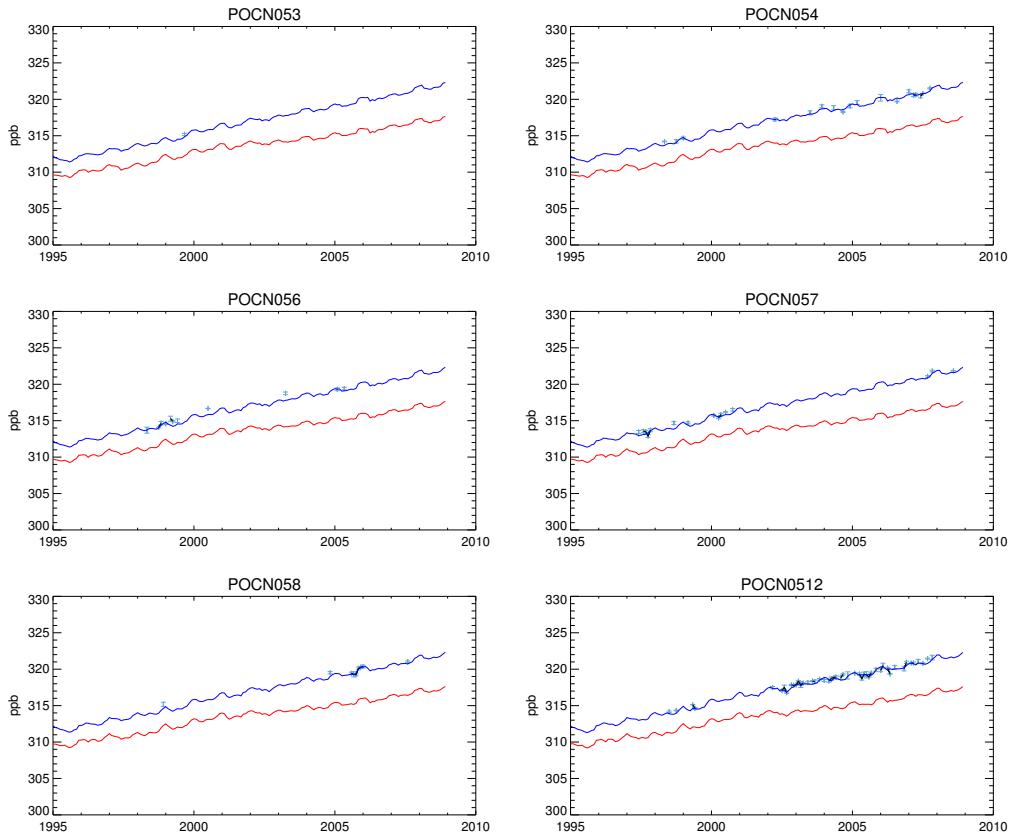
**Fig. S1g.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



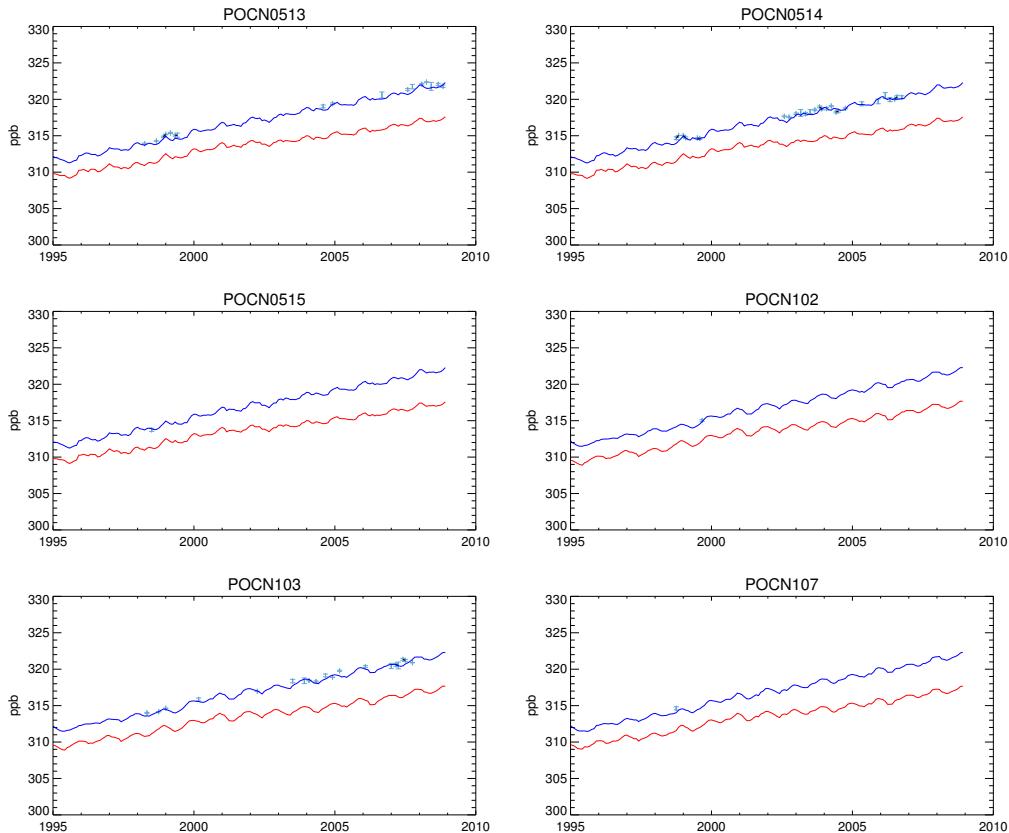
**Fig. S1h.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



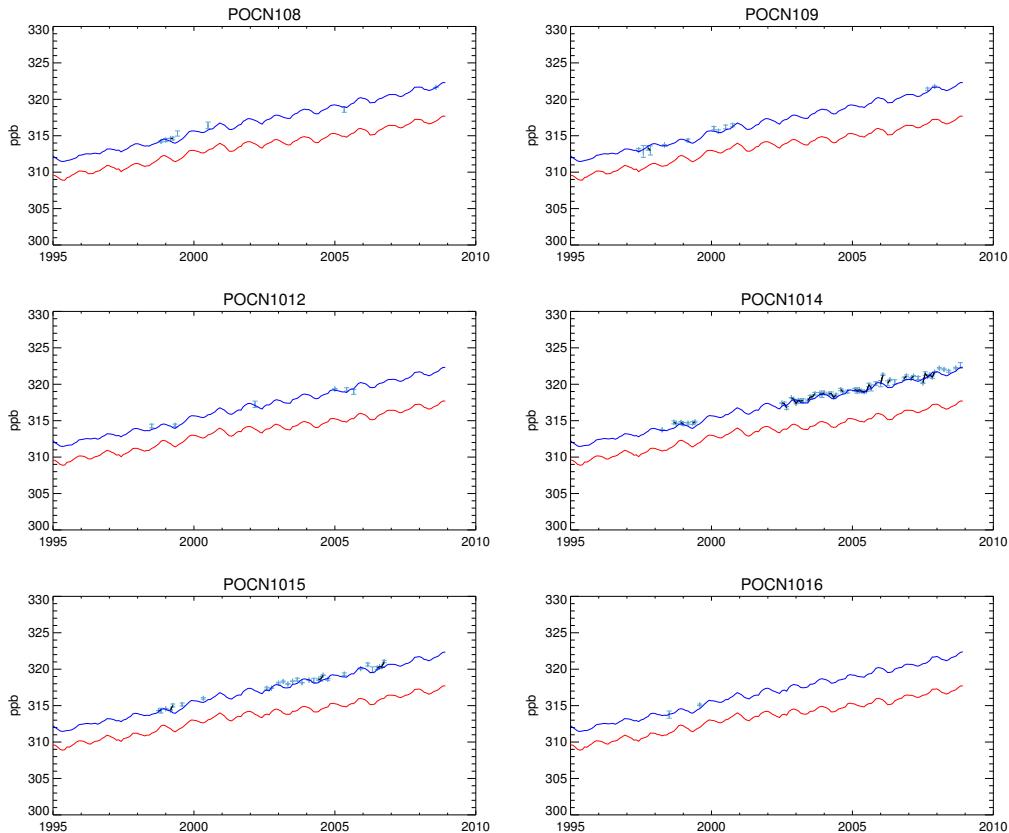
**Fig. S1i.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



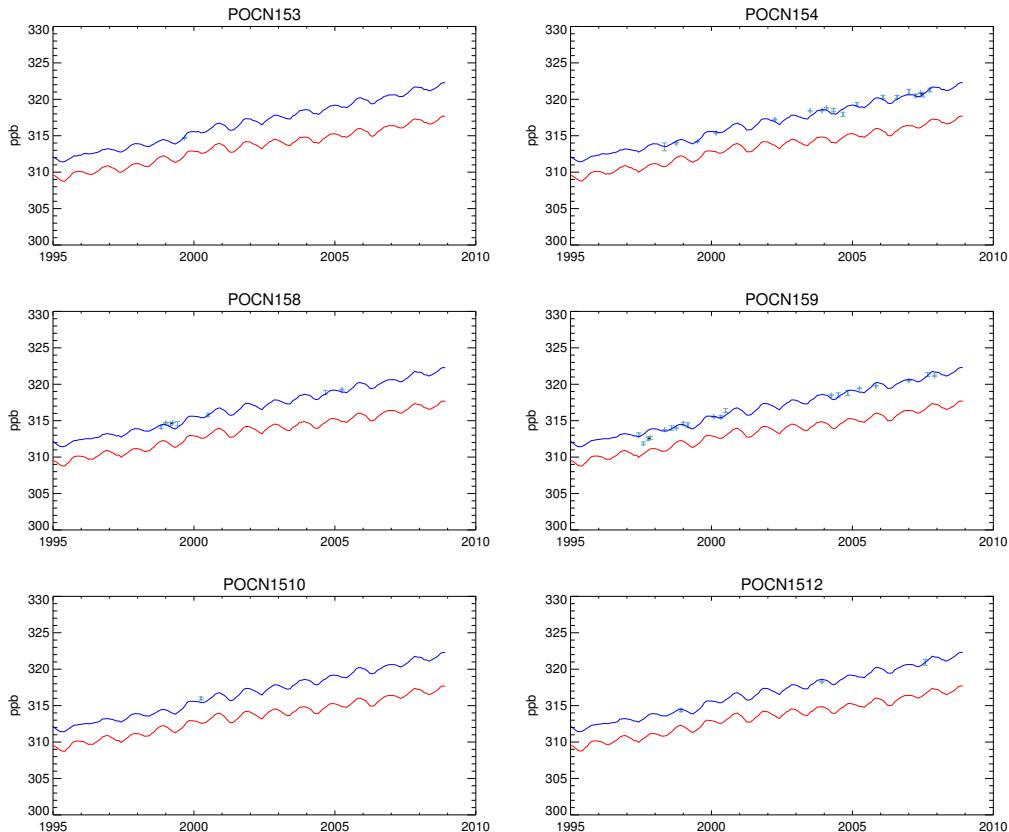
**Fig. S1j.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



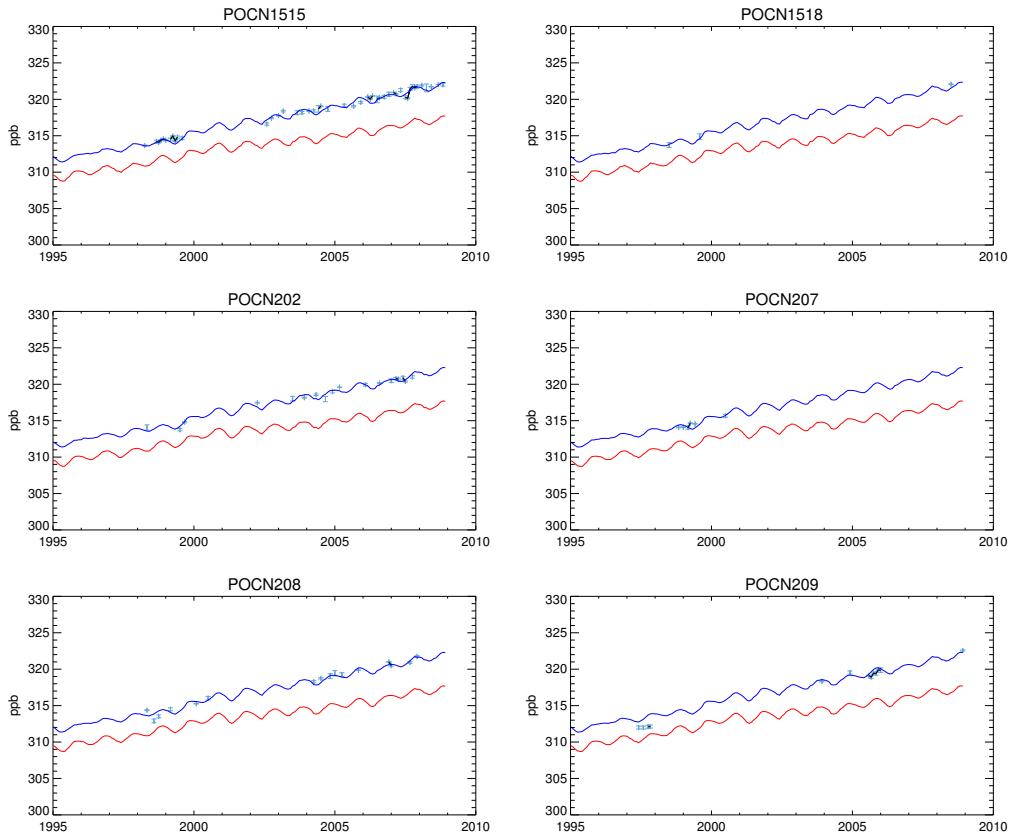
**Fig. S1k.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



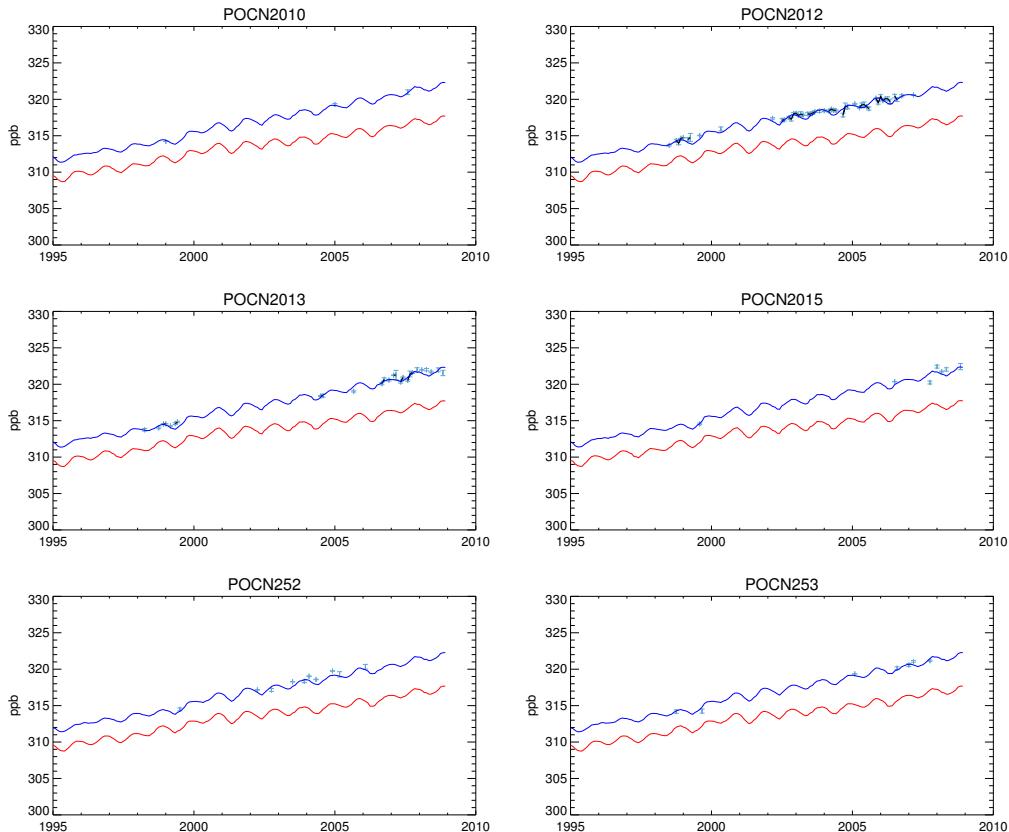
**Fig. S1I.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



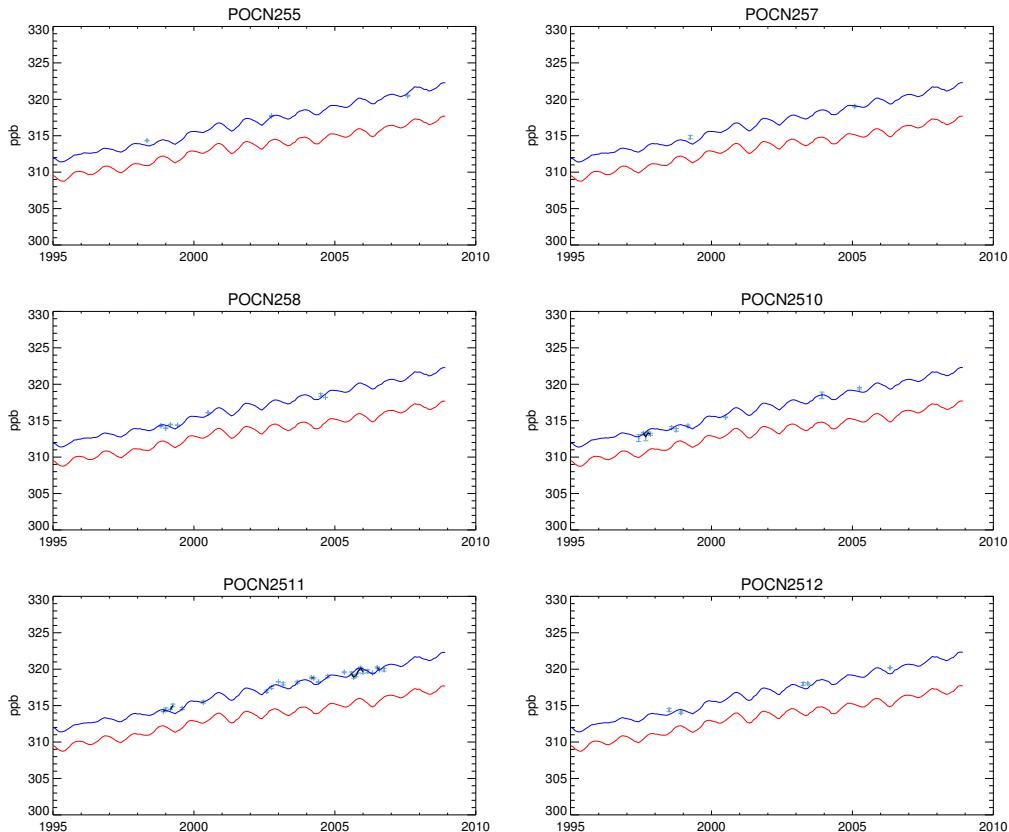
**Fig. S1m.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



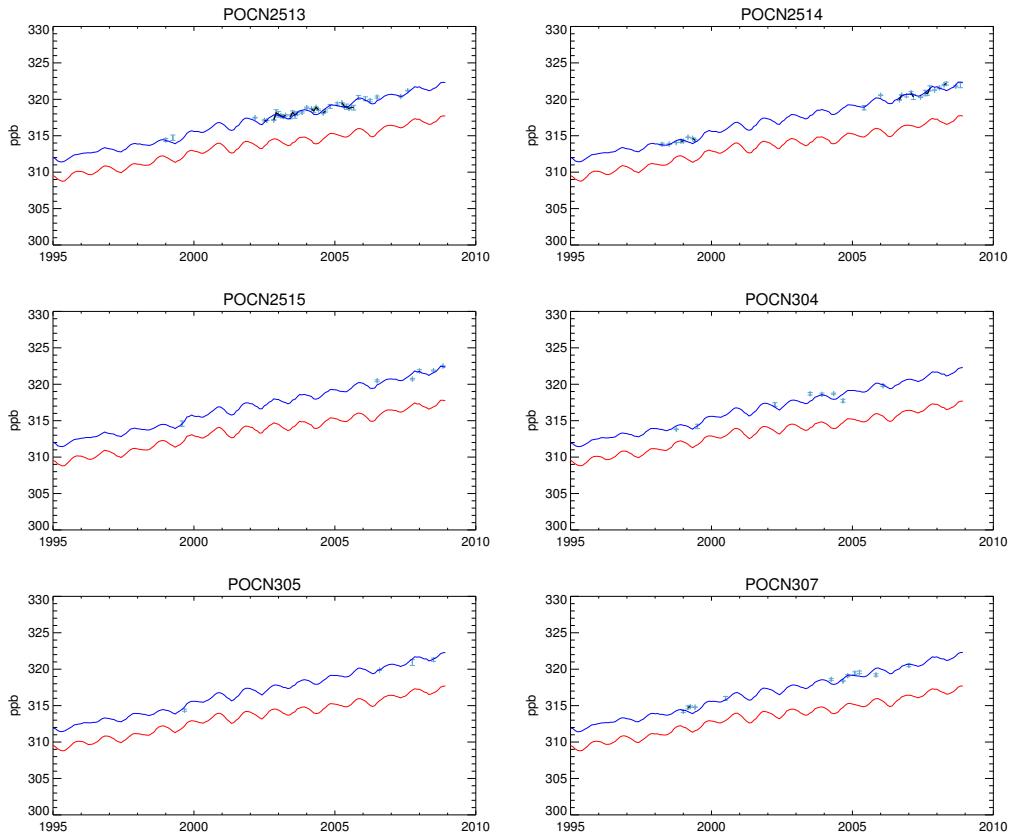
**Fig. S1n.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



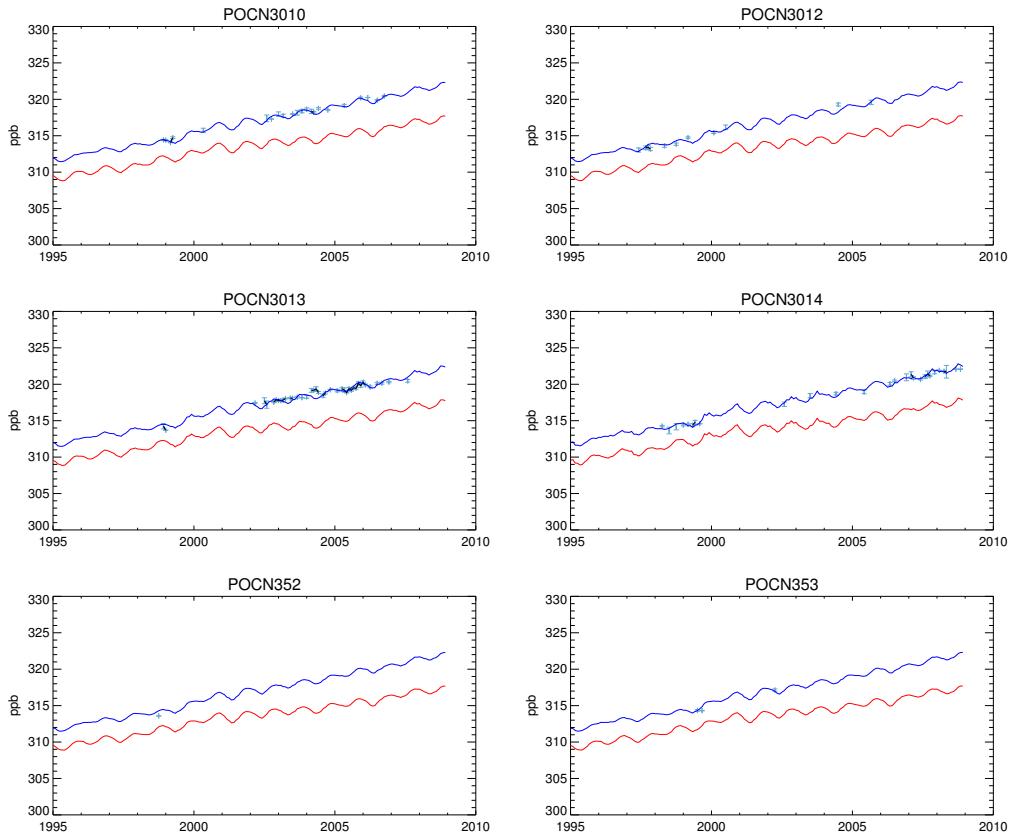
**Fig. S1o.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



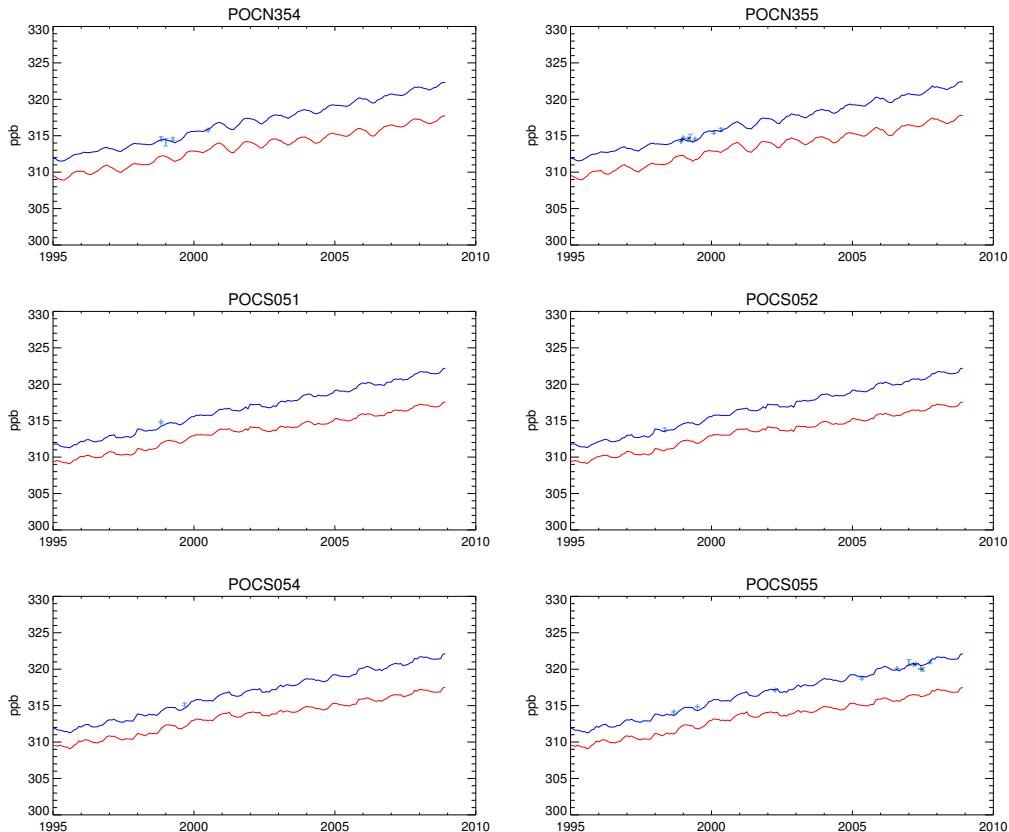
**Fig. S1p.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



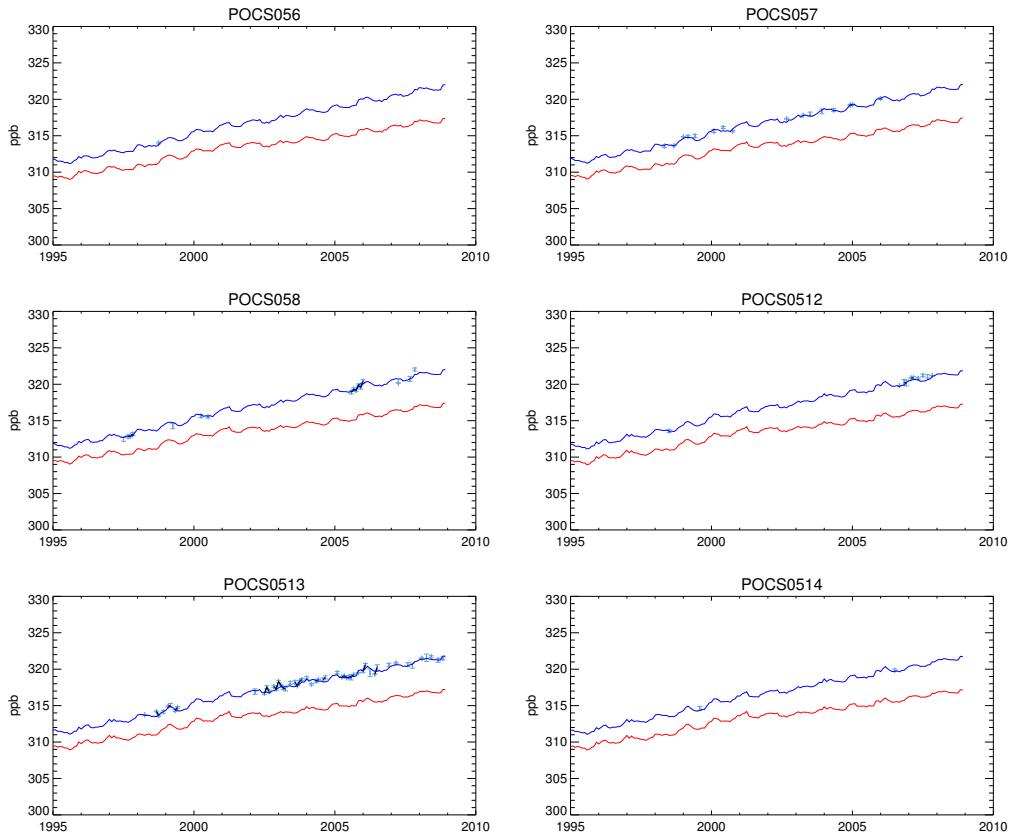
**Fig. S1q.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



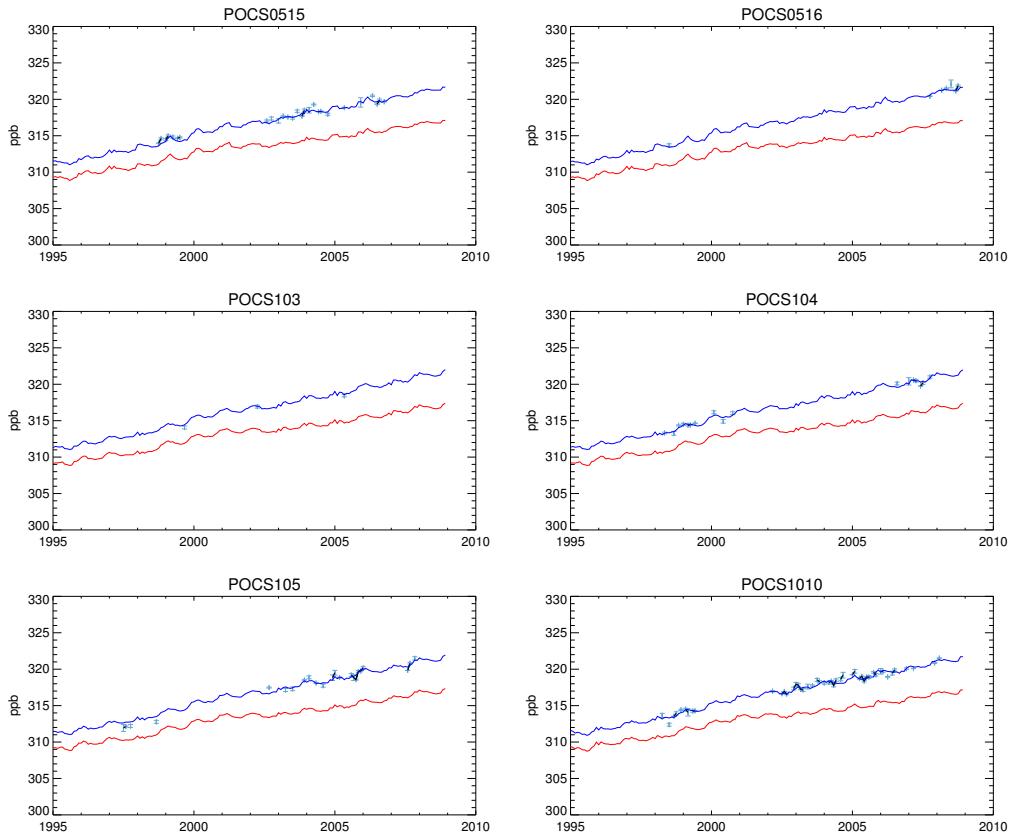
**Fig. S1r.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



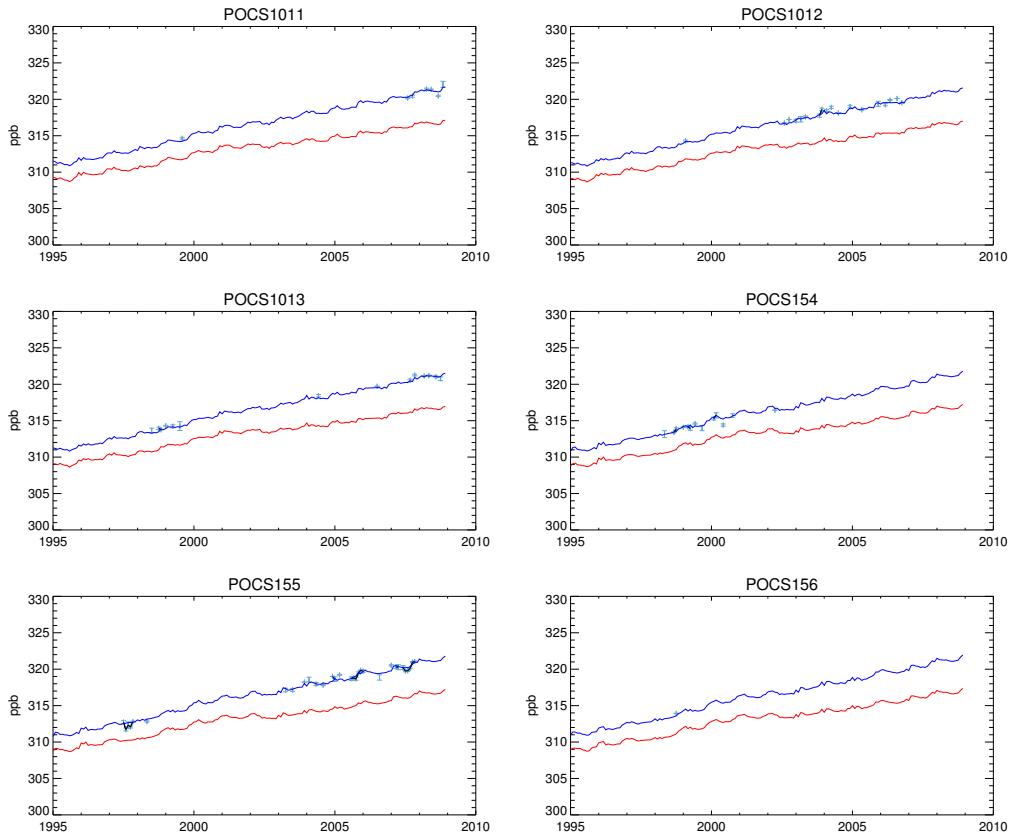
**Fig. S1s.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



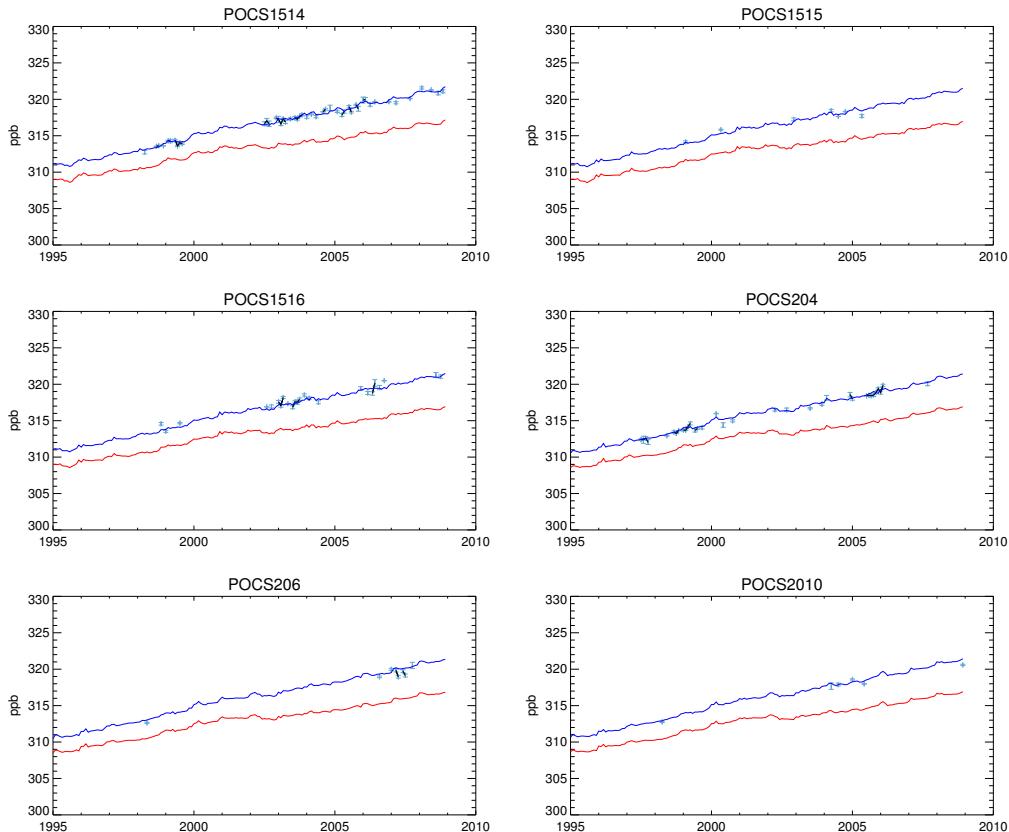
**Fig. S1t.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



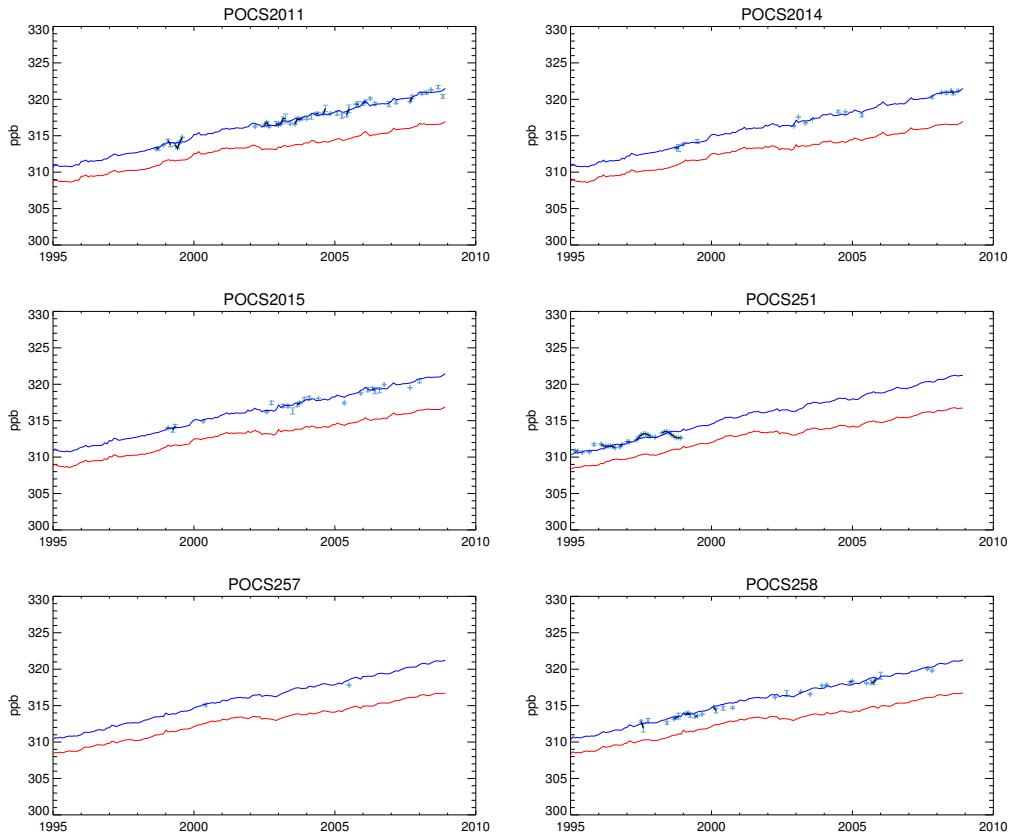
**Fig. S1u.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



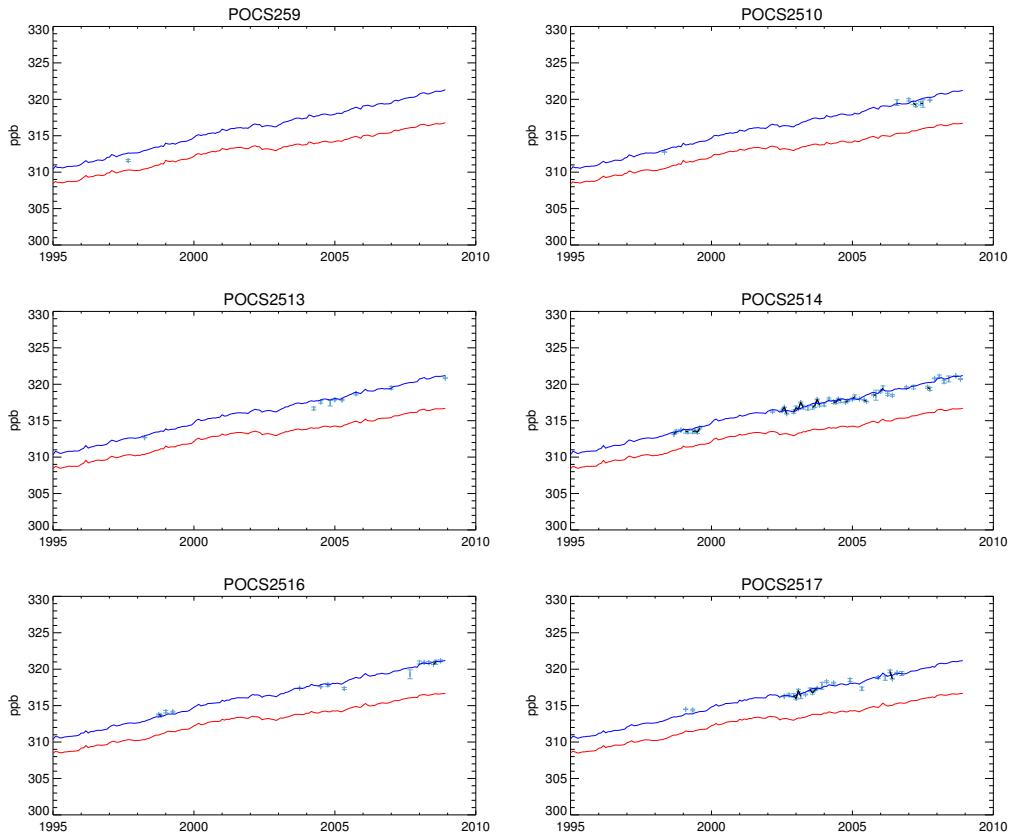
**Fig. S1v.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



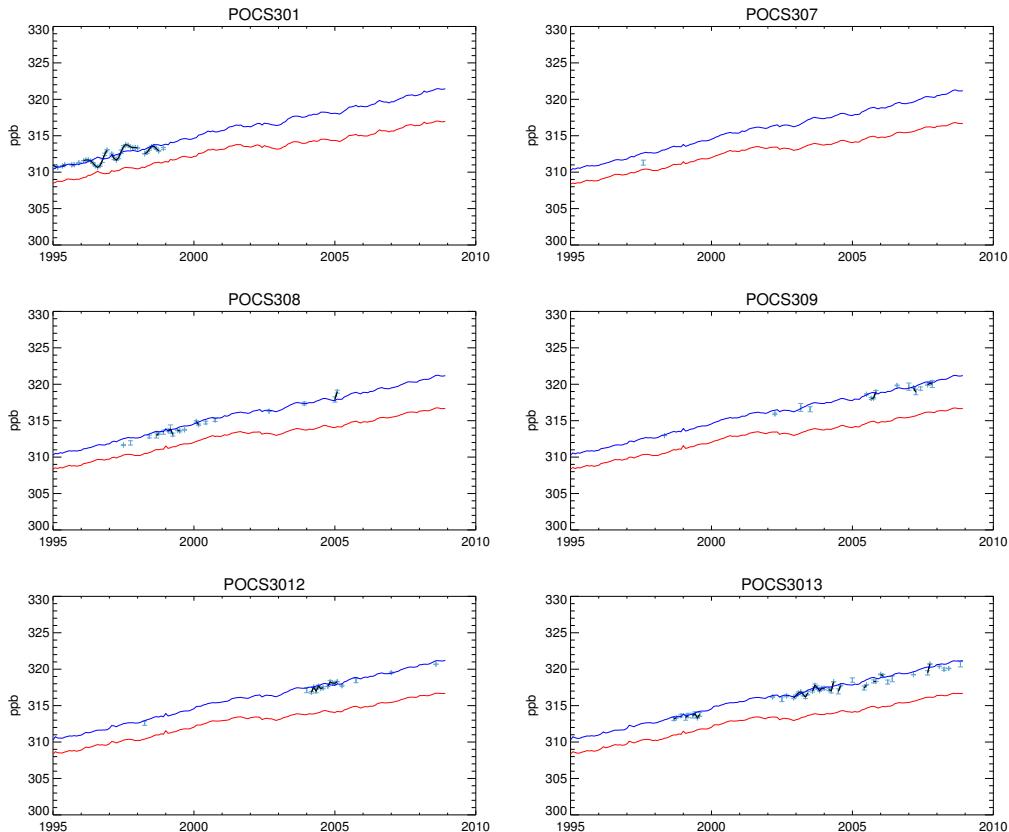
**Fig. S1w.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



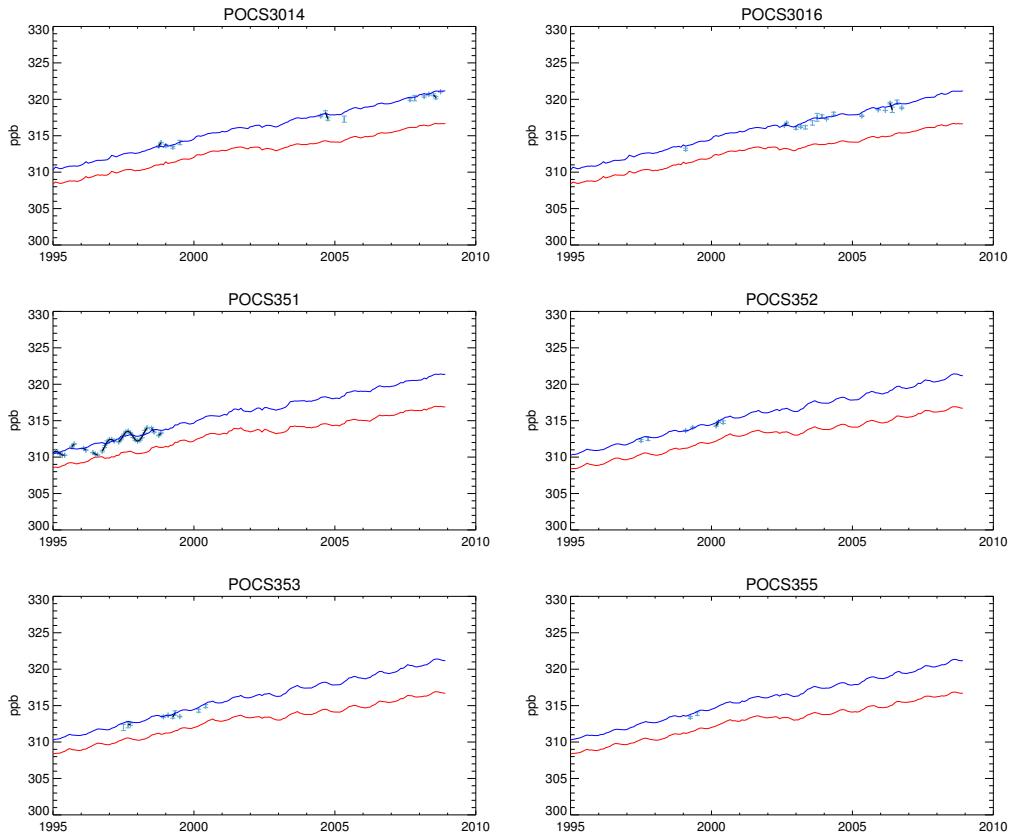
**Fig. S1x.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



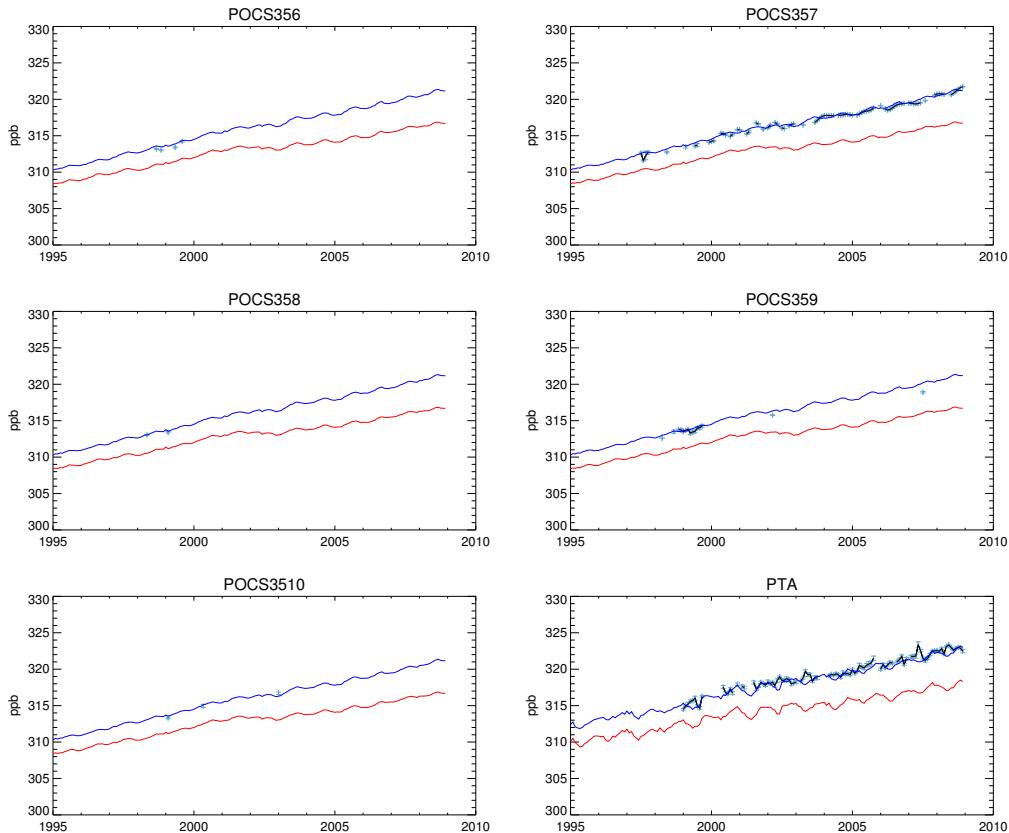
**Fig. S1y.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



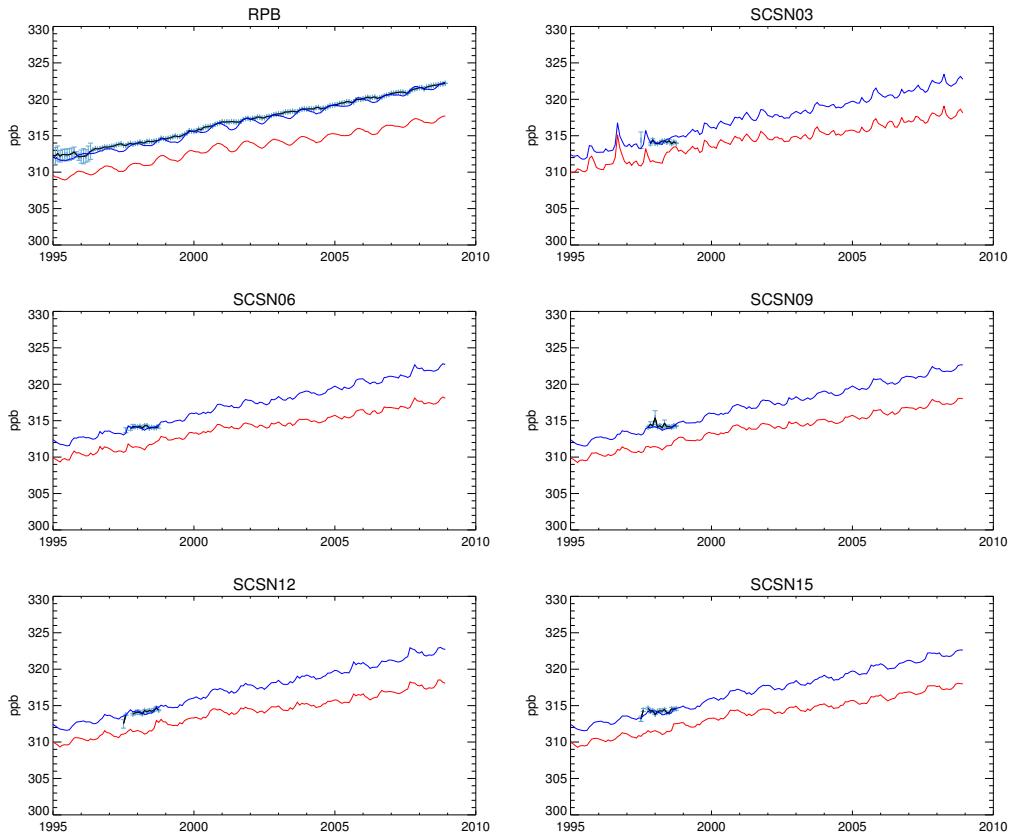
**Fig. S1z.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



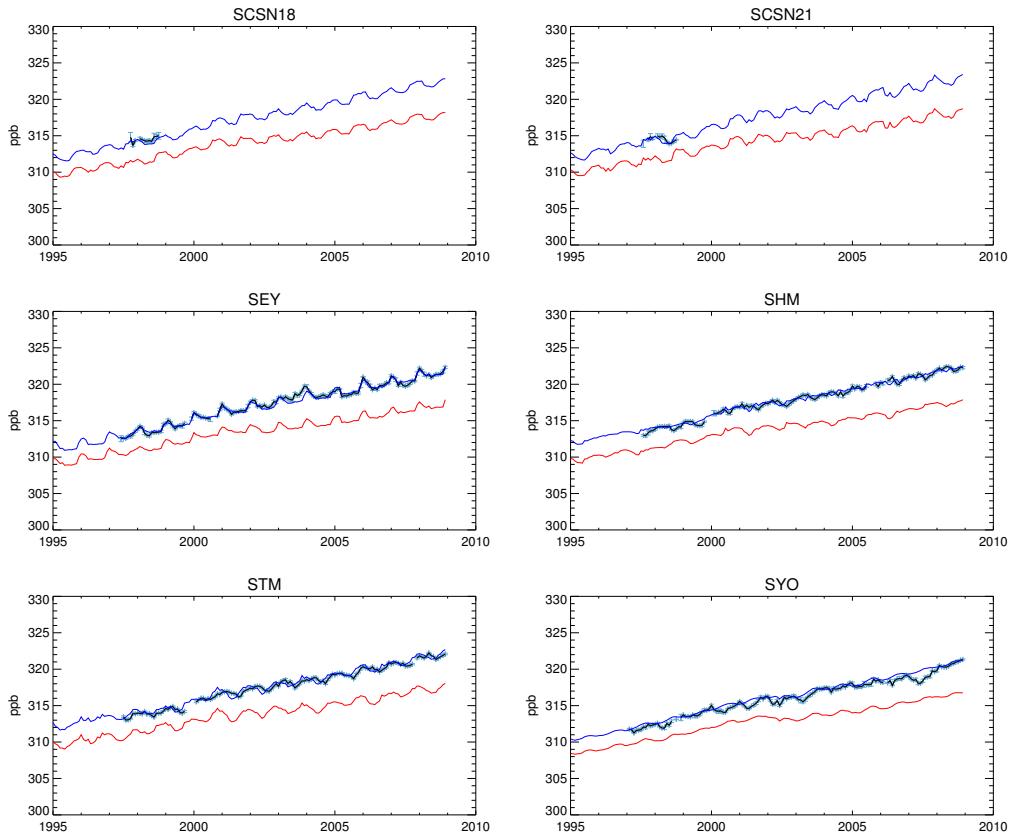
**Fig. S1aa.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



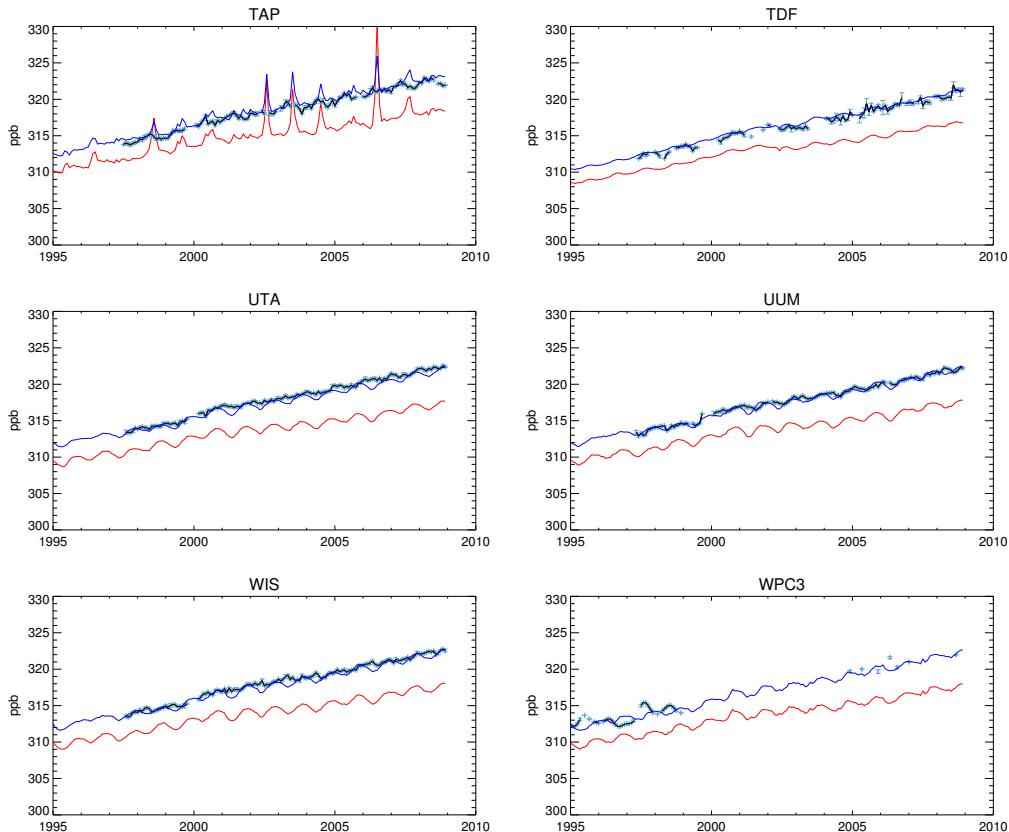
**Fig. S1ab.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



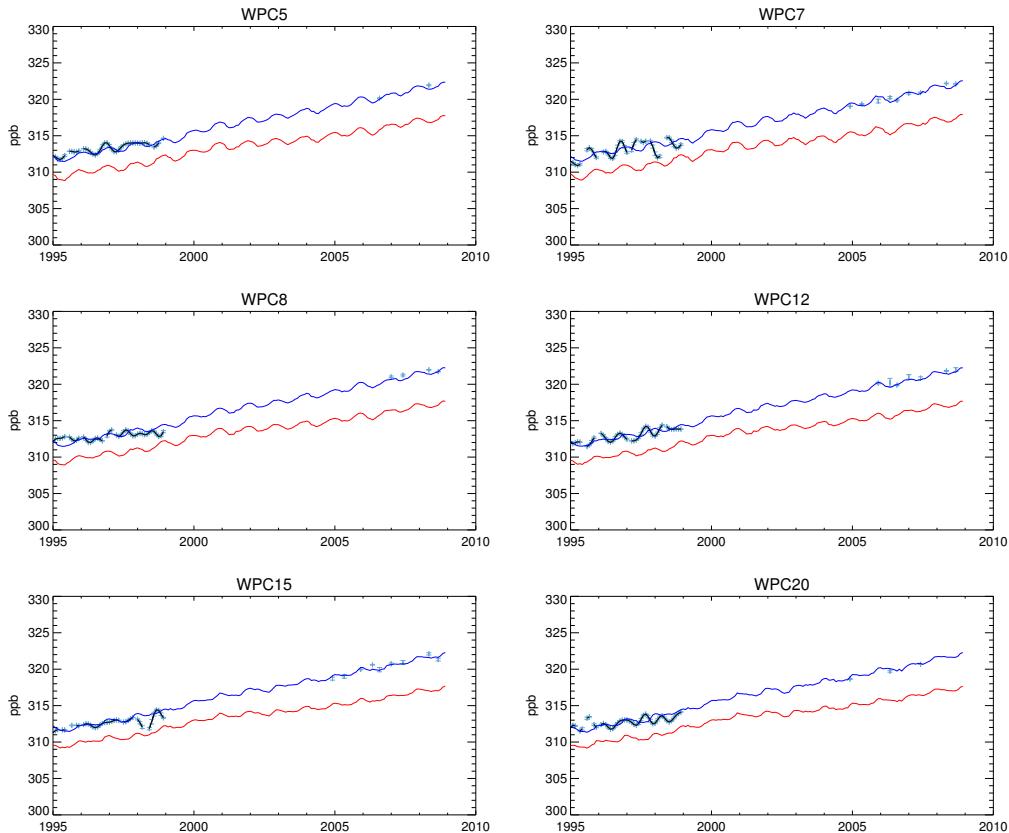
**Fig. S1ac.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



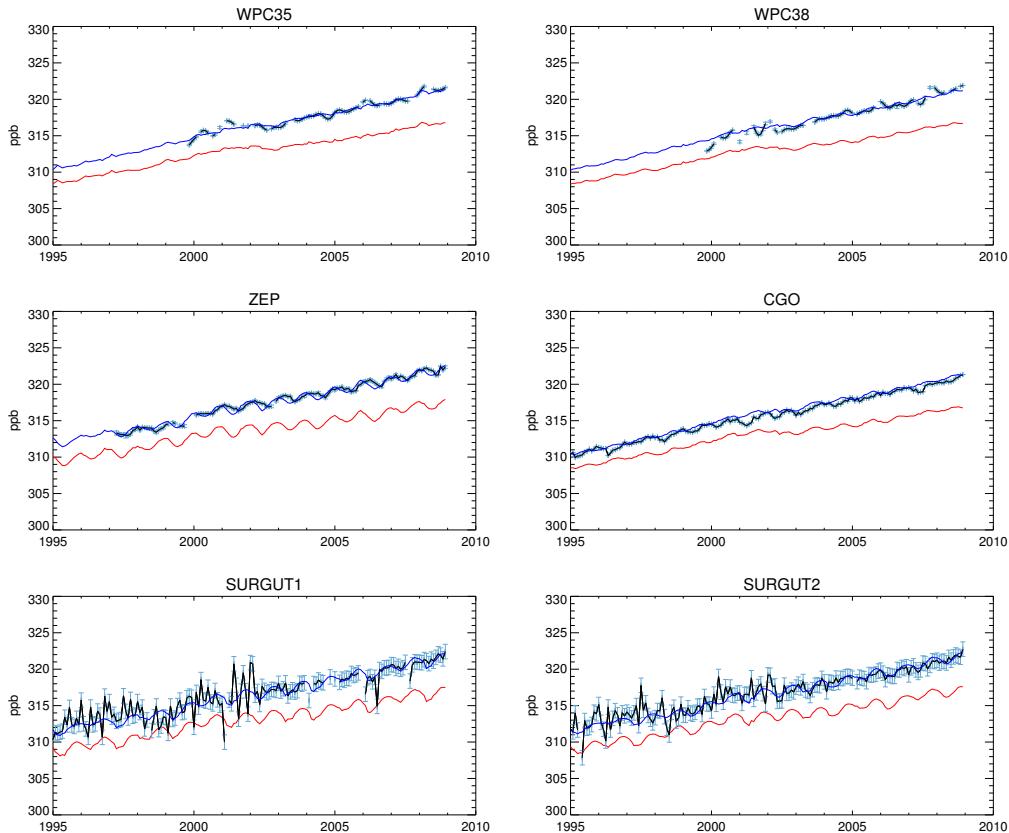
**Fig. S1ad.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



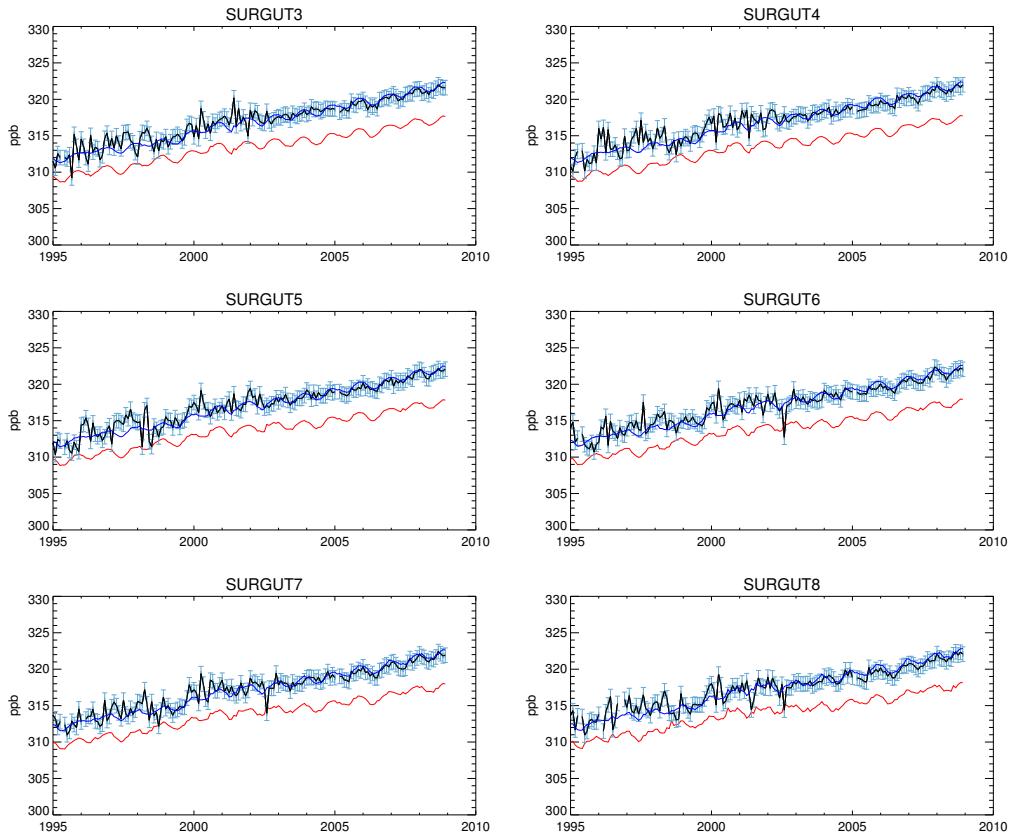
**Fig. S1ae.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



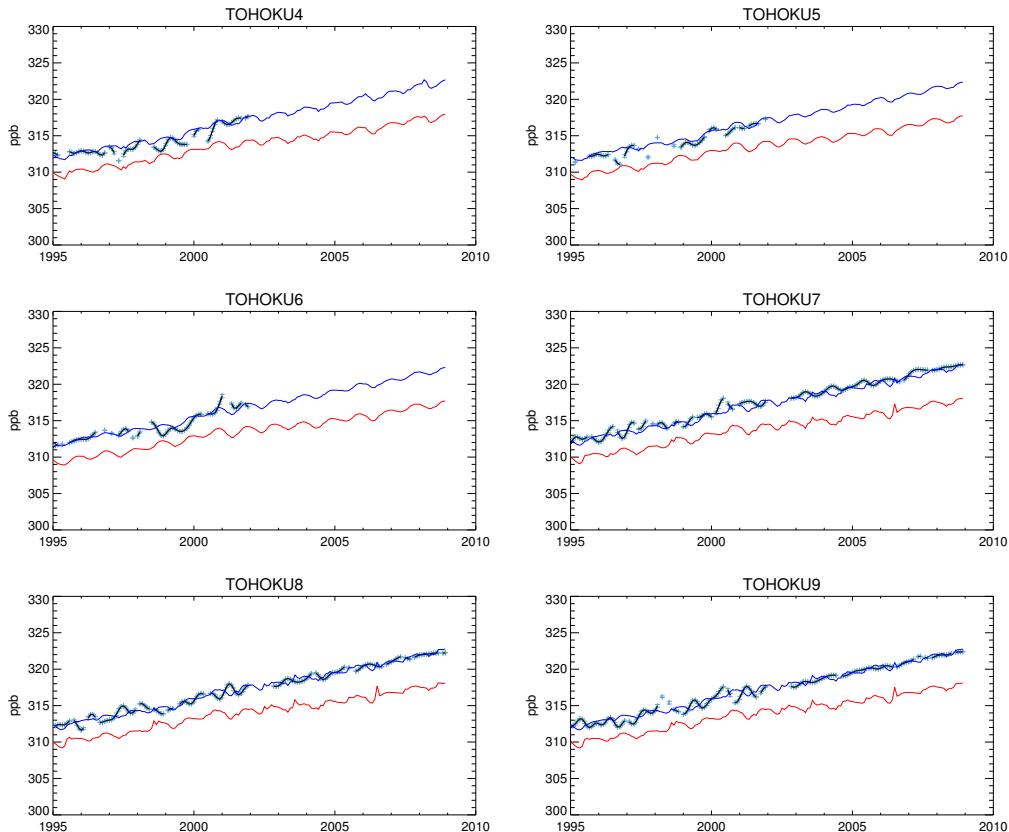
**Fig. S1af.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



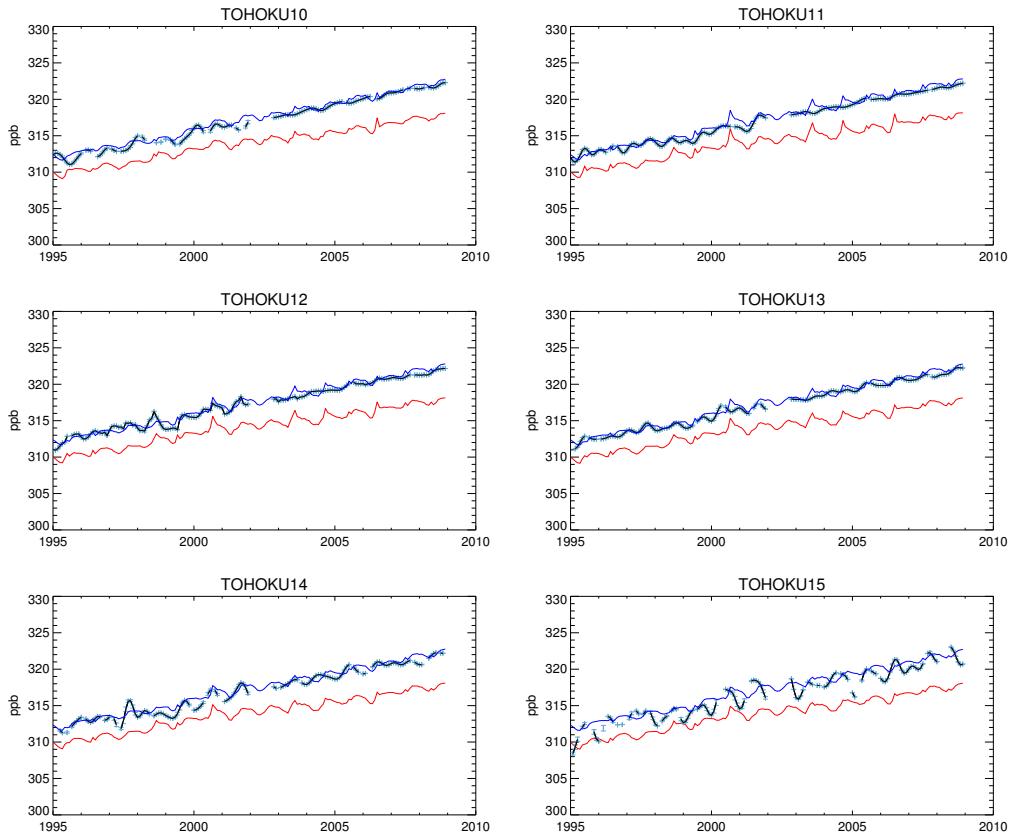
**Fig. S1ag.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



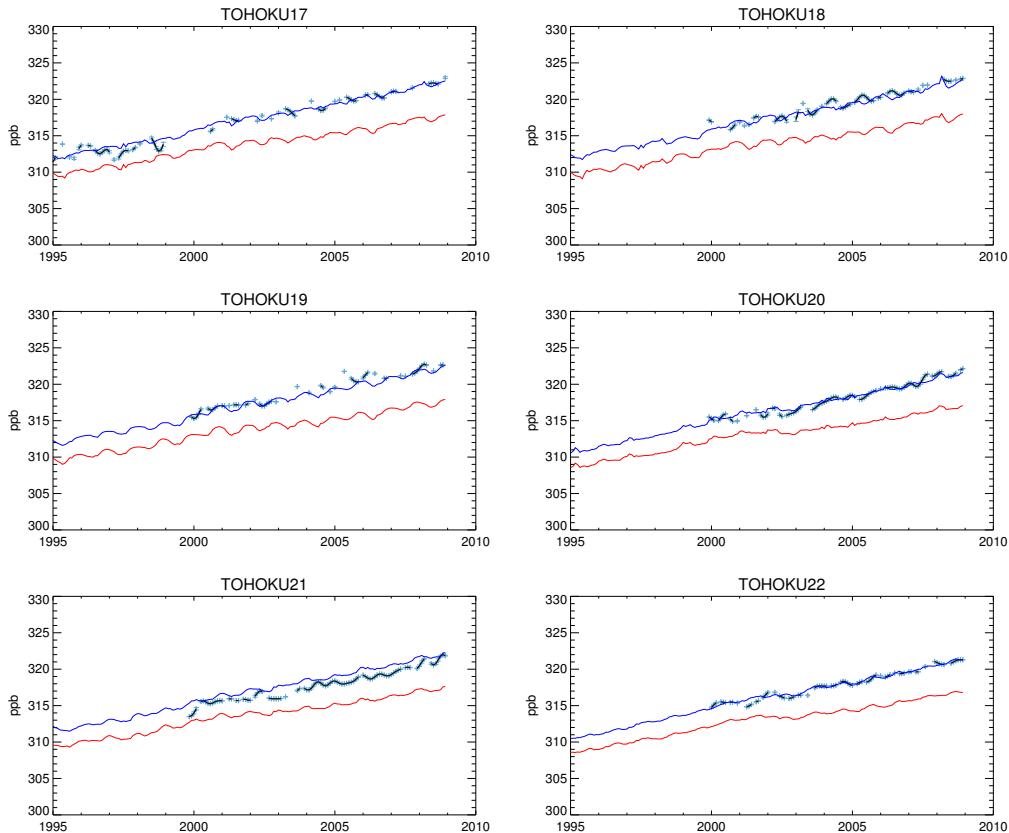
**Fig. S1ah.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



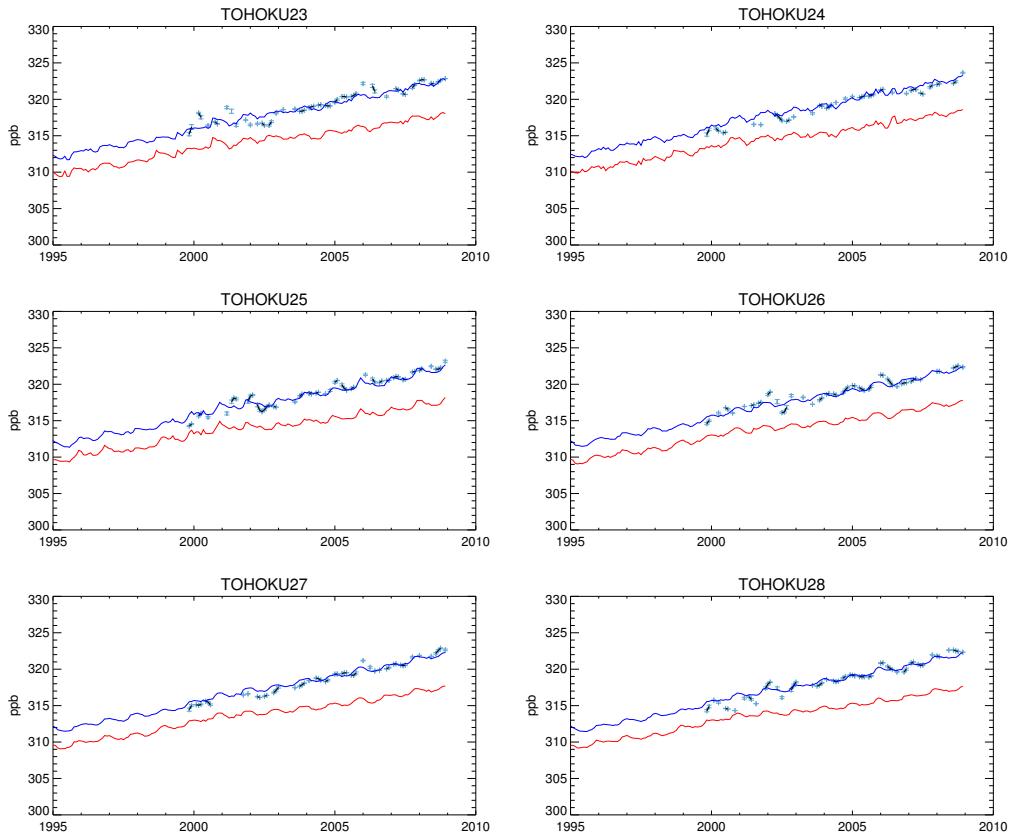
**Fig. S1ai.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



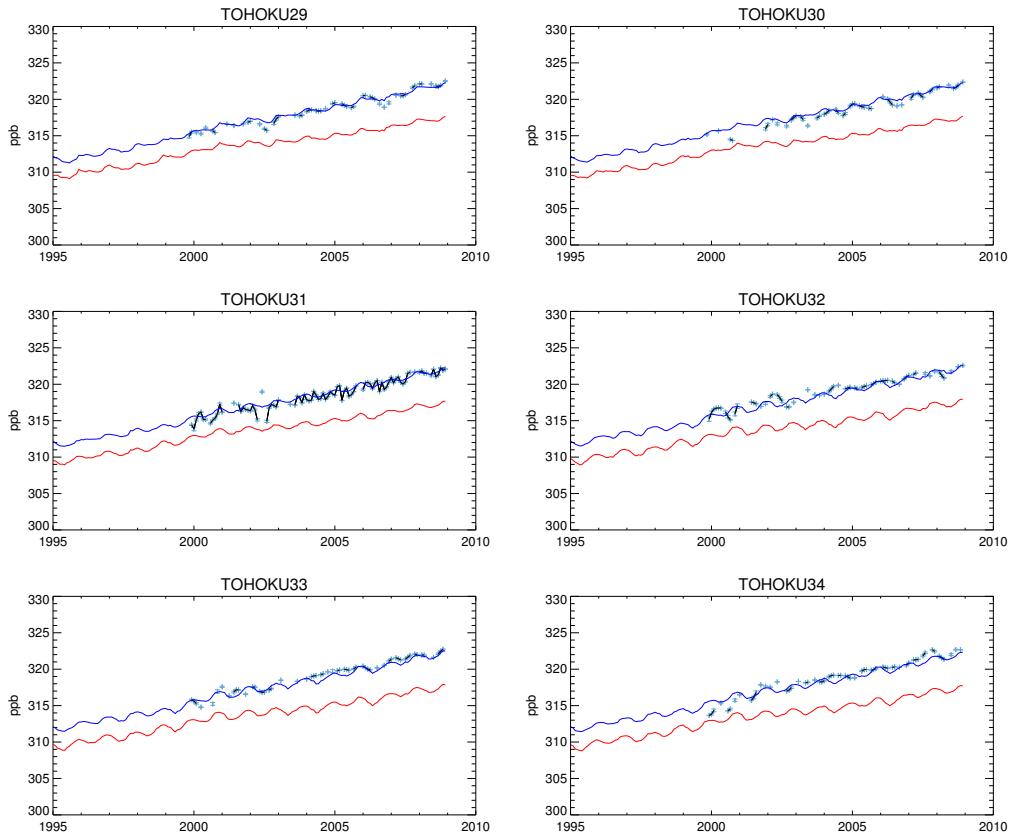
**Fig. S1aj.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



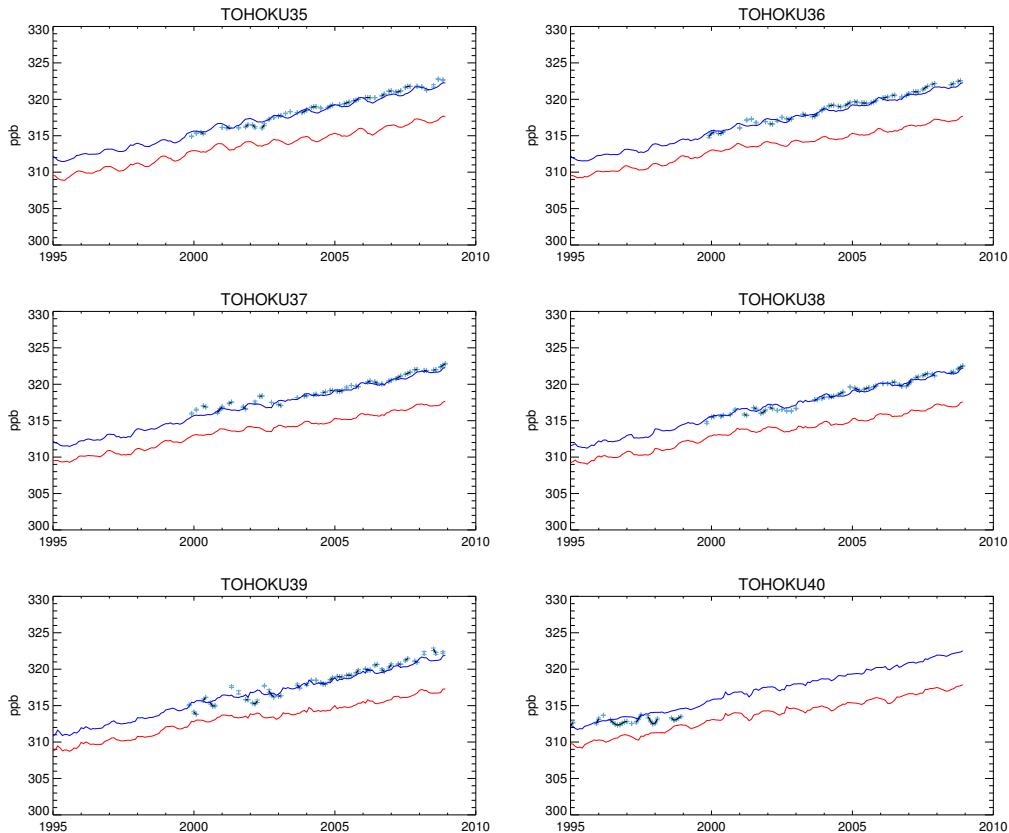
**Fig. S1ak.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



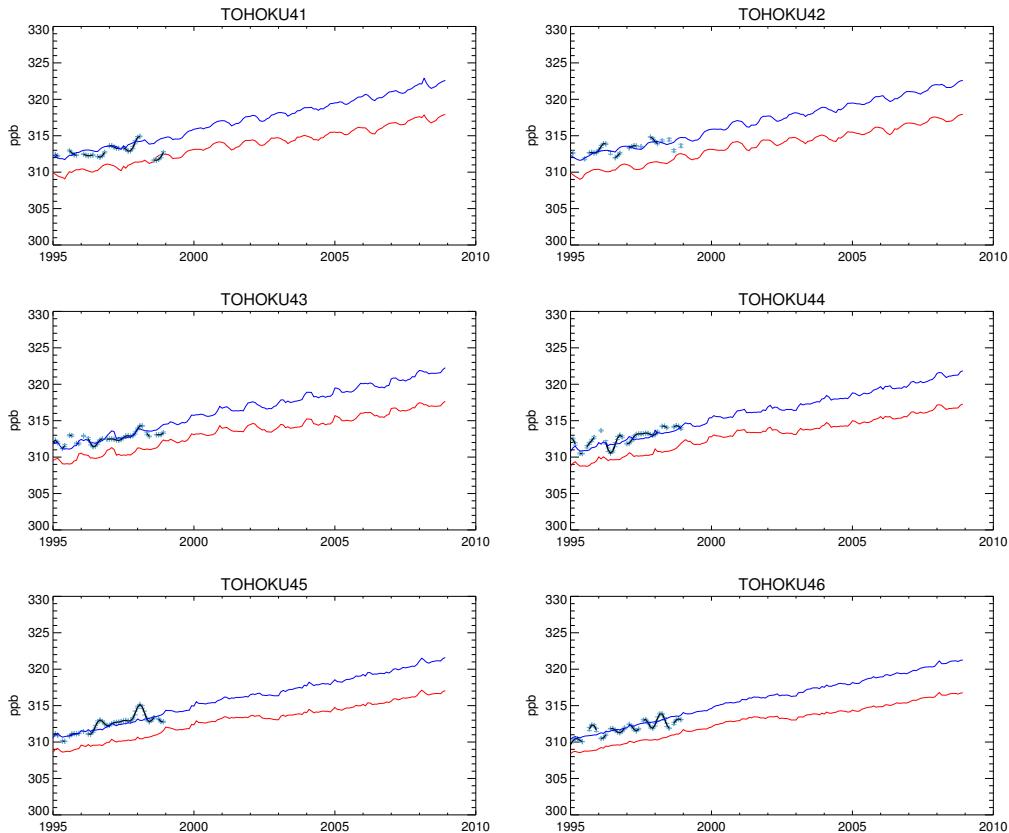
**Fig. S1al.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



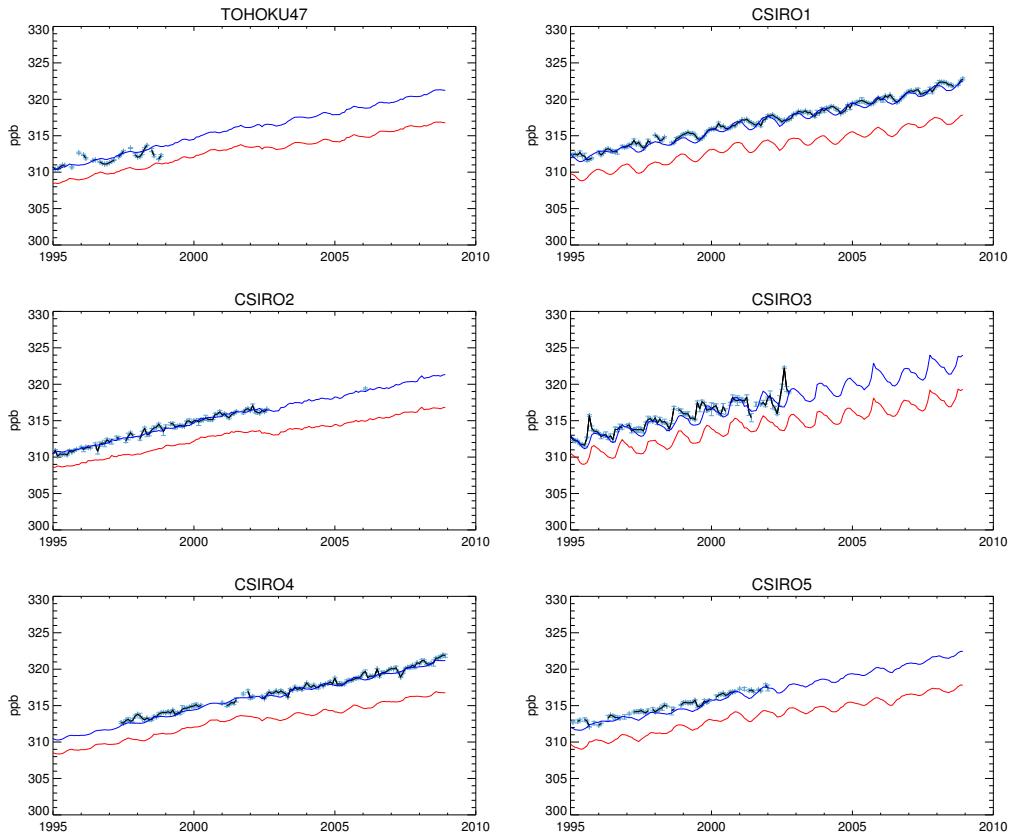
**Fig. S1am.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



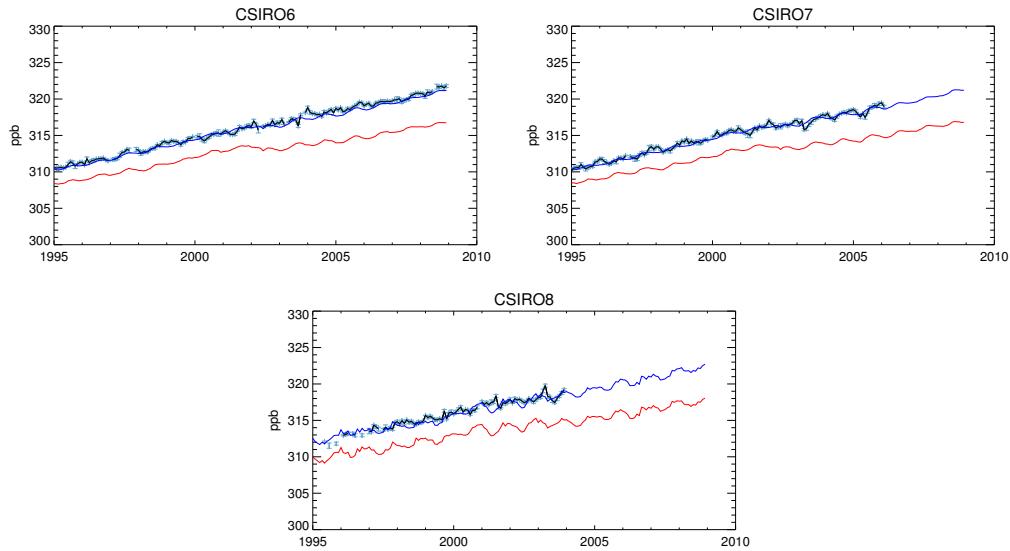
**Fig. S1an.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



**Fig. S1ao.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



**Fig. S1ap.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).



**Fig. S1aq.** Monthly atmospheric mole fractions: measurements (black solid lines with standard deviations), and MOZART v4 model results using prior emissions (red solid lines) and optimized emissions (blue solid lines).

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1	-5.30E-02	-5.59E-03	-2.14E-02	-1.84E-02	-3.09E-02	3.13E-03
	Southern Asia	-5.30E-02	1	7.53E-03	-9.59E-02	1.04E-02	-4.49E-02	9.10E-03
	Central/South America	-5.59E-03	7.53E-03	1	-4.50E-04	2.61E-03	1.39E-03	-7.38E-03
	Northern Asia	-2.14E-02	-9.59E-02	-4.50E-04	1	-1.59E-01	-4.68E-02	-1.09E-02
	Europe	-1.84E-02	1.04E-02	2.61E-03	-1.59E-01	1	-6.24E-02	7.76E-04
	North America	-3.09E-02	-4.49E-02	1.39E-03	-4.68E-02	-6.24E-02	1	1.93E-03
	Oceania	3.13E-03	9.10E-03	-7.38E-03	-1.09E-02	7.76E-04	1.93E-03	1
Industrial	Africa/Middle East	-5.86E-03	-9.86E-03	-9.06E-04	-6.11E-03	-5.35E-03	-7.09E-03	3.23E-04
	Southern Asia	8.80E-03	-2.52E-01	1.97E-03	-3.44E-02	1.72E-02	1.84E-02	-4.37E-03
	Central/South America	-5.05E-04	6.47E-04	-1.33E-03	-3.85E-05	2.25E-04	9.49E-05	-6.51E-04
	Northern Asia	-9.95E-03	-4.40E-02	1.10E-03	-8.19E-02	-7.72E-02	-2.65E-02	-6.61E-03
	Europe	-2.45E-02	1.56E-03	2.88E-03	-1.42E-01	-3.96E-01	-6.79E-02	1.37E-03
	North America	-1.56E-02	-2.15E-02	7.58E-04	-2.30E-02	-3.31E-02	-6.12E-02	9.82E-04
	Oceania	2.33E-04	6.32E-04	-4.49E-04	-8.24E-04	8.22E-05	1.19E-04	-8.90E-03
Natural Soil	Africa/Middle East	-6.45E-02	-7.07E-02	-2.61E-02	-9.84E-03	-7.65E-03	-4.29E-02	6.74E-03
	Southern Asia	-3.12E-02	-3.16E-01	-1.00E-02	-2.34E-02	2.08E-02	-9.64E-03	3.22E-02
	Central/South America	-4.72E-02	3.23E-02	-7.88E-02	3.71E-03	2.23E-02	-1.35E-02	-4.70E-03
	Northern Asia	2.92E-02	-1.80E-02	-4.93E-03	-9.46E-02	-1.26E-02	2.89E-02	-2.16E-02
	Europe	-4.44E-03	-1.15E-04	1.31E-03	-4.06E-02	-1.03E-01	-2.04E-02	2.22E-03
	North America	-4.13E-02	-8.55E-02	2.36E-03	-4.49E-02	-1.01E-01	-1.82E-01	1.38E-02
	Oceania	1.62E-03	1.38E-02	-7.92E-03	-8.46E-03	2.02E-03	3.22E-03	-1.00E-01
Ocean	North Pacific	6.12E-03	-2.34E-02	-9.01E-04	-2.63E-02	1.33E-02	-6.44E-03	-3.20E-03
	South Pacific	-1.84E-02	6.34E-02	-2.19E-02	2.01E-02	2.63E-02	1.49E-02	2.61E-02
	Northern Ocean	1.05E-02	3.25E-02	-9.60E-04	-1.64E-02	-5.83E-02	-6.06E-04	-2.33E-03
	Atlantic	-3.55E-02	-2.90E-03	-1.09E-02	-3.83E-02	-7.79E-02	-5.01E-02	2.06E-03
	Southern Ocean	2.24E-02	4.63E-02	-3.91E-02	-9.24E-03	-3.20E-03	2.15E-03	-2.13E-02
	Indian Ocean	-2.72E-02	-1.14E-01	-2.66E-02	-3.12E-03	2.54E-03	-5.07E-03	-3.10E-02
	Africa/Middle East	-1.96E-02	-3.57E-02	-8.56E-03	4.60E-03	4.95E-03	-6.89E-03	4.23E-03
Biomass burning	Southern Asia	-1.09E-02	-3.43E-02	-8.20E-03	-6.96E-04	3.98E-03	-4.09E-03	2.98E-03
	Central/South America	-2.27E-03	-3.22E-03	-1.53E-03	2.12E-04	6.19E-04	-5.25E-04	7.43E-04
	Northern Asia	1.72E-03	-1.45E-02	-5.81E-04	-7.08E-03	1.55E-03	3.09E-03	-6.05E-04
	Europe	-1.91E-06	1.67E-04	6.50E-06	-1.77E-04	-1.48E-04	-1.23E-05	1.92E-05
	North America	6.96E-04	2.16E-03	-6.89E-05	1.07E-03	-2.04E-03	9.03E-04	2.05E-04
	Oceania	-9.82E-04	-7.69E-04	-1.34E-03	-1.10E-05	4.02E-04	2.52E-05	-4.27E-04

**Fig. S2a.** Correlation of the emissions in 1995 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-5.86E-03	8.80E-03	-5.05E-04	-9.95E-03	-2.45E-02	-1.56E-02	2.33E-04
	Southern Asia	-9.86E-03	-2.52E-01	6.47E-04	-4.40E-02	1.56E-03	-2.15E-02	6.32E-04
	Central/South America	-9.06E-04	1.97E-03	-1.33E-03	1.10E-03	2.88E-03	7.58E-04	-4.49E-04
	Northern Asia	-6.11E-03	-3.44E-02	-3.85E-05	-8.19E-02	-1.42E-01	-2.30E-02	-8.24E-04
	Europe	-5.35E-03	1.72E-02	2.25E-04	-7.72E-02	-3.96E-01	-3.31E-02	8.22E-05
	North America	-7.09E-03	1.84E-02	9.49E-05	-2.65E-02	-6.79E-02	-6.12E-02	1.19E-04
Industrial	Oceania	3.23E-04	-4.37E-03	-6.51E-04	-6.61E-03	1.37E-03	9.82E-04	-8.90E-03
	Africa/Middle East	1	1.31E-03	-8.25E-05	-3.13E-03	-6.93E-03	-3.59E-03	2.53E-05
	Southern Asia	1.31E-03	1	1.84E-04	-3.67E-02	1.55E-02	9.51E-03	-3.07E-04
	Central/South America	-8.25E-05	1.84E-04	1	9.33E-05	2.43E-04	5.35E-05	-4.00E-05
	Northern Asia	-3.13E-03	-3.67E-02	9.33E-05	1	-7.94E-02	-1.30E-02	-3.96E-04
	Europe	-6.93E-03	1.55E-02	2.43E-04	-7.94E-02	1	-3.47E-02	1.23E-04
Natural Soil	North America	-3.59E-03	9.51E-03	5.35E-05	-1.30E-02	-3.47E-02	1	6.22E-05
	Oceania	2.53E-05	-3.07E-04	-4.00E-05	-3.96E-04	1.23E-04	6.22E-05	1
	Africa/Middle East	-1.12E-02	2.92E-02	-2.35E-03	2.13E-04	-1.53E-02	-2.16E-02	5.84E-04
	Southern Asia	-5.36E-03	-2.60E-01	-7.81E-04	-4.38E-02	2.12E-02	-4.06E-03	2.32E-03
	Central/South America	-7.44E-03	3.35E-02	-6.81E-03	1.46E-02	2.00E-02	-5.85E-03	-5.82E-05
	Northern Asia	6.31E-03	-2.27E-02	-4.52E-04	-5.98E-02	-4.17E-02	1.02E-02	-1.66E-03
Ocean	Europe	-1.18E-03	1.36E-02	1.16E-04	-2.01E-02	-8.57E-02	-1.04E-02	1.93E-04
	North America	-8.14E-03	8.63E-02	1.42E-04	-1.36E-02	-9.74E-02	-1.03E-01	9.94E-04
	Oceania	1.21E-04	-1.02E-03	-7.32E-04	-6.54E-03	3.00E-03	1.72E-03	-6.82E-03
	North Pacific	1.94E-04	-1.05E-02	-6.15E-05	-1.12E-02	1.83E-03	-5.82E-03	-1.93E-04
	South Pacific	-2.17E-03	2.65E-02	-1.96E-03	1.96E-02	3.03E-02	7.76E-03	1.81E-03
	Northern Ocean	1.84E-03	1.62E-03	-7.89E-05	-3.35E-03	-1.79E-02	-2.73E-03	-1.33E-04
Biomass burning	Atlantic	-7.09E-03	-3.12E-03	-9.53E-04	-2.11E-02	-5.15E-02	-2.75E-02	1.42E-04
	Southern Ocean	3.01E-03	-2.75E-02	-3.25E-03	-7.55E-03	-4.44E-03	1.18E-03	-1.72E-03
	Indian Ocean	-4.52E-03	2.67E-02	-2.42E-03	1.29E-02	3.34E-03	-2.68E-03	-2.50E-03
	Africa/Middle East	3.06E-03	7.63E-03	7.57E-04	4.66E-03	4.23E-03	-3.19E-03	2.92E-04
	Southern Asia	-1.91E-03	-5.12E-04	-7.35E-04	1.20E-03	3.68E-03	-2.04E-03	2.37E-04
	Central/South America	-4.09E-04	1.71E-03	-1.32E-04	6.29E-04	5.51E-04	-2.38E-04	5.29E-05

**Fig. S2b.** Correlation of the emissions in 1995 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-6.45E-02	-3.12E-02	-4.72E-02	2.92E-02	-4.44E-03	-4.13E-02	1.62E-03
	Southern Asia	-7.07E-02	-3.16E-01	3.23E-02	-1.80E-02	-1.15E-04	-8.55E-02	1.38E-02
	Central/South America	-2.61E-02	-1.00E-02	-7.88E-02	-4.93E-03	1.31E-03	2.36E-03	-7.92E-03
	Northern Asia	-9.84E-03	-2.34E-02	3.71E-03	-9.46E-02	-4.06E-02	-4.49E-02	-8.46E-03
	Europe	-7.65E-03	2.08E-02	2.23E-02	-1.26E-02	-1.03E-01	-1.01E-01	2.02E-03
	North America	-4.29E-02	-9.64E-03	-1.35E-02	2.89E-02	-2.04E-02	-1.82E-01	3.22E-03
Industrial	Oceania	6.74E-03	3.22E-02	-4.70E-03	-2.16E-02	2.22E-03	1.38E-02	-1.00E-01
	Africa/Middle East	-1.12E-02	-5.36E-03	-7.44E-03	6.31E-03	-1.18E-03	-8.14E-03	1.21E-04
	Southern Asia	2.92E-02	-2.60E-01	3.35E-02	-2.27E-02	1.36E-02	8.63E-02	-1.02E-03
	Central/South America	-2.35E-03	-7.81E-04	-6.81E-03	-4.52E-04	1.16E-04	1.42E-04	-7.32E-03
	Northern Asia	2.13E-04	-4.38E-02	1.46E-02	-5.98E-02	-2.01E-02	-1.36E-02	-6.54E-03
	Europe	-1.53E-02	2.12E-02	2.00E-02	-4.17E-02	-8.57E-02	-9.74E-02	3.00E-03
Natural Soil	North America	-2.16E-02	-4.06E-03	-5.85E-03	1.02E-02	-1.04E-02	-1.03E-01	1.72E-03
	Oceania	5.84E-04	2.32E-03	-5.82E-05	-1.66E-03	1.93E-04	9.94E-04	-6.82E-03
	Africa/Middle East	1	-8.00E-02	-1.98E-01	4.15E-02	-4.27E-03	-9.98E-02	7.89E-04
	Southern Asia	-8.00E-02	1	-2.41E-01	-1.99E-01	2.42E-02	-2.10E-02	1.63E-02
	Central/South America	-1.98E-01	-2.41E-01	1	7.29E-03	6.57E-03	-9.97E-01	-1.15E-02
	Northern Asia	4.15E-02	-1.99E-01	7.29E-03	1	-1.29E-01	-2.18E-01	-3.35E-02
Ocean	Europe	-4.27E-03	2.42E-02	6.57E-03	-1.29E-01	1	-9.31E-02	3.35E-03
	North America	-9.98E-02	-2.10E-02	-9.97E-02	-2.18E-01	-9.31E-02	1	1.50E-02
	Oceania	7.89E-04	1.63E-02	-1.15E-02	-3.35E-02	3.35E-03	1.50E-02	1
	North Pacific	3.09E-02	-1.76E-02	1.06E-02	-9.16E-02	2.84E-02	3.68E-02	-4.12E-04
	South Pacific	-7.54E-02	-1.03E-01	-3.15E-01	-4.24E-02	2.45E-02	8.21E-03	-7.17E-03
	Northern Ocean	2.07E-02	5.38E-02	1.96E-02	-5.65E-02	-8.04E-03	1.88E-02	-8.56E-04
Biomass burning	Atlantic	-8.66E-02	1.92E-02	-4.96E-02	5.29E-02	-1.03E-03	2.10E-02	3.08E-04
	Southern Ocean	1.01E-01	1.20E-01	7.88E-02	-5.36E-02	-2.61E-03	4.56E-02	-6.07E-03
	Indian Ocean	-6.34E-02	-6.25E-02	-7.26E-02	-6.49E-03	3.61E-03	-3.62E-03	-2.90E-02
	Africa/Middle East	6.47E-02	2.72E-03	5.97E-02	1.66E-02	1.74E-03	-1.67E-02	1.20E-03
	Southern Asia	-4.11E-02	-1.09E-02	-2.12E-02	1.43E-02	7.67E-03	3.60E-05	-1.44E-03
	Central/South America	-8.79E-03	7.69E-04	-1.27E-02	4.08E-03	1.04E-03	-3.76E-03	-7.41E-04
Biomass burning	Northern Asia	1.73E-03	8.58E-03	4.98E-03	-2.61E-02	6.98E-04	9.36E-03	-4.01E-04
	Europe	5.78E-05	3.89E-04	9.31E-05	-1.32E-03	-9.38E-05	-8.87E-05	3.22E-05
	North America	7.07E-04	5.44E-03	-5.07E-04	-1.39E-02	-2.18E-03	-6.00E-03	2.46E-04
	Oceania	1	-4.08E-03	-7.06E-04	-3.89E-03	5.27E-04	5.19E-04	-1.60E-04
								-1.79E-03

**Fig. S2c.** Correlation of the emissions in 1995 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	6.12E-03	-1.84E-02	1.05E-02	-3.55E-02	2.24E-02	-2.72E-02
	Southern Asia	-2.34E-02	6.34E-02	3.25E-02	-2.90E-03	4.63E-02	-1.14E-01
	Central/South America	-9.01E-04	-2.19E-02	-9.60E-04	-1.09E-02	-3.91E-02	-2.66E-02
	Northern Asia	-2.63E-02	2.01E-02	-1.64E-02	-3.83E-02	-9.24E-03	-3.12E-03
	Europe	1.33E-02	2.63E-02	-5.83E-02	-7.79E-02	-3.20E-03	2.54E-03
	North America	-6.44E-03	1.49E-02	-6.06E-04	-5.01E-02	2.15E-03	-5.07E-03
	Oceania	-3.20E-03	2.61E-02	-2.33E-03	2.06E-03	-2.13E-02	-3.10E-02
Industrial	Africa/Middle East	1.94E-04	-2.17E-03	1.84E-03	-7.09E-03	3.01E-03	-4.52E-03
	Southern Asia	-1.05E-02	2.65E-02	1.62E-03	-3.12E-03	-2.75E-02	2.67E-02
	Central/South America	-6.15E-05	-1.96E-03	-7.89E-05	-9.53E-04	-3.25E-03	-2.42E-03
	Northern Asia	-1.12E-02	1.96E-02	-3.35E-03	-2.11E-02	-7.55E-03	1.29E-02
	Europe	1.83E-03	3.03E-02	-1.79E-02	-5.15E-02	-4.44E-03	3.34E-03
	North America	-5.82E-03	7.76E-03	-2.73E-03	-2.75E-02	1.18E-03	-2.68E-03
	Oceania	-1.93E-04	1.81E-03	-1.33E-04	1.42E-04	-1.72E-03	-2.50E-03
Natural Soil	Africa/Middle East	3.09E-02	-7.54E-02	2.07E-02	-8.66E-02	1.01E-01	-6.34E-02
	Southern Asia	-1.76E-02	-1.03E-01	5.38E-02	1.92E-02	1.20E-01	-6.25E-02
	Central/South America	1.06E-02	-3.15E-01	1.96E-02	-4.96E-02	7.88E-02	-7.26E-02
	Northern Asia	-9.16E-02	-4.24E-02	-5.65E-02	5.29E-02	-5.36E-02	-6.49E-03
	Europe	2.84E-02	2.45E-02	-8.04E-03	-1.03E-03	-2.61E-03	3.61E-03
	North America	3.68E-02	8.21E-03	1.88E-02	2.10E-02	4.56E-02	-3.62E-03
	Oceania	-4.12E-04	-7.17E-03	-8.56E-04	3.08E-04	-6.07E-03	-2.90E-02
Ocean	North Pacific		1	2.02E-02	-2.14E-02	-5.96E-02	-1.97E-02
	South Pacific	2.02E-02		1	1.37E-02	-1.85E-02	6.01E-02
	Northern Ocean	-2.14E-02	1.37E-02		1	-1.43E-01	3.39E-03
	Atlantic	-5.96E-02	-1.85E-02	-1.43E-01		1	-4.32E-02
	Southern Ocean	-1.97E-02	6.01E-02	3.39E-03	-4.32E-02		-3.89E-01
	Indian Ocean	2.45E-02	-2.20E-02	8.13E-04	-2.95E-02	-3.89E-01	
Biomass burning	Africa/Middle East	1.25E-02	-4.45E-02	6.18E-03	-3.45E-02	2.80E-02	-2.12E-02
	Southern Asia	-3.29E-03	-3.48E-02	-1.73E-03	-1.95E-02	4.76E-02	-1.18E-02
	Central/South America	1.06E-03	-1.76E-02	-7.69E-05	-4.14E-03	3.76E-03	-2.00E-03
	Northern Asia	-2.26E-02	1.92E-03	-4.41E-04	-1.11E-03	-1.21E-03	3.37E-03
	Europe	8.57E-05	1.40E-04	-2.64E-04	-2.52E-04	9.58E-06	4.60E-05
	North America	1.12E-03	7.13E-04	-3.53E-03	5.06E-04	-1.26E-04	1.25E-04
	Oceania	9.65E-05	-4.95E-03	-4.05E-04	-1.90E-03	6.60E-03	-2.27E-03

**Fig. S2d.** Correlation of the emissions in 1995 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.96E-02	-1.09E-02	-2.27E-03	1.72E-03	-1.91E-06	6.96E-04	-9.82E-04
	Southern Asia	-3.57E-02	-3.43E-02	-3.22E-03	-1.45E-02	1.67E-04	2.16E-03	-7.69E-04
	Central/South America	-8.56E-03	-8.20E-03	-1.53E-03	-5.81E-04	6.50E-06	-6.89E-05	-1.34E-03
	Northern Asia	4.60E-03	-6.96E-04	2.12E-04	-7.08E-03	-1.77E-04	1.07E-03	-1.10E-05
	Europe	4.95E-03	3.98E-03	6.19E-04	1.55E-03	-1.48E-04	-2.04E-03	4.02E-04
	North America	-6.89E-03	-4.09E-03	-5.25E-04	3.09E-03	-1.23E-05	9.03E-04	2.52E-05
Industrial	Oceania	4.23E-03	2.98E-03	7.43E-04	-6.05E-04	1.92E-05	2.05E-04	-4.27E-04
	Africa/Middle East	-3.06E-03	-1.91E-03	-4.09E-04	2.31E-04	-3.19E-06	1.93E-04	-1.72E-04
	Southern Asia	7.63E-03	-5.12E-04	1.71E-03	-1.74E-02	4.65E-05	1.72E-03	5.75E-04
	Central/South America	-7.57E-04	-7.35E-04	-1.32E-04	-5.34E-05	2.31E-07	-5.60E-06	-1.17E-04
	Northern Asia	4.66E-03	1.20E-03	6.29E-04	-6.61E-03	-9.21E-05	1.03E-03	2.04E-04
	Europe	4.23E-03	3.68E-03	5.51E-04	-1.73E-04	-1.91E-04	-4.77E-05	4.35E-04
Natural Soil	North America	-3.19E-03	-2.04E-03	-2.38E-04	1.54E-03	-6.03E-07	2.26E-04	3.03E-05
	Oceania	2.92E-04	2.37E-04	5.29E-05	-2.98E-05	1.15E-06	1.74E-05	-2.09E-05
	Africa/Middle East	-6.47E-02	-4.11E-02	-8.79E-03	1.73E-03	5.78E-05	7.07E-04	-4.08E-03
	Southern Asia	2.72E-03	-1.09E-02	7.69E-04	8.58E-03	3.89E-04	5.44E-03	-7.06E-04
	Central/South America	-5.97E-02	-2.12E-02	-1.27E-02	4.98E-03	9.31E-05	-5.07E-04	-3.89E-03
	Northern Asia	1.66E-02	1.43E-02	4.08E-03	-2.61E-02	-1.32E-03	-1.39E-02	5.27E-04
Ocean	Europe	1.74E-03	7.67E-03	1.04E-03	6.98E-04	-9.38E-05	-2.18E-03	5.19E-04
	North America	-1.67E-02	3.60E-05	-3.76E-03	9.36E-03	-8.87E-05	-6.00E-03	-1.60E-04
	Oceania	1.20E-03	-1.44E-03	-7.41E-04	-4.01E-04	3.22E-05	2.46E-04	-1.79E-03
	North Pacific	1.25E-02	-3.29E-03	1.06E-03	-2.26E-02	8.57E-05	1.12E-03	9.65E-05
	South Pacific	-4.45E-02	-3.48E-02	-1.76E-02	1.92E-03	1.40E-04	7.13E-04	-4.95E-03
	Northern Ocean	6.18E-03	-1.73E-03	-7.69E-05	-4.41E-04	-2.64E-04	-3.53E-03	-4.05E-04
Biomass burning	Atlantic	-3.45E-02	-1.95E-02	-4.14E-03	-1.11E-03	-2.52E-04	5.06E-04	-1.90E-03
	Southern Ocean	2.80E-02	4.76E-02	3.76E-03	-1.21E-03	9.58E-06	-1.26E-04	6.60E-03
	Indian Ocean	-2.12E-02	-1.18E-02	-2.00E-03	3.37E-03	4.60E-05	1.25E-04	-2.27E-03
	Africa/Middle East	1	-1.66E-02	-4.43E-03	2.73E-04	2.91E-05	2.11E-04	-2.00E-03
	Southern Asia	-1.66E-02	1	-4.81E-03	-4.79E-03	2.83E-05	7.57E-04	-3.48E-03
	Central/South America	-4.43E-03	-4.81E-03	1	-2.49E-04	3.59E-06	8.31E-05	-7.74E-04

**Fig. S2e.** Correlation of the emissions in 1995 for biomass burning.

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -3.41E-02	-7.86E-03	-1.87E-02	-1.84E-02	-3.23E-02	1.40E-03	
	Southern Asia	-3.41E-02	1	1.87E-02	-1.07E-01	3.33E-03	-3.28E-02	6.14E-05
	Central/South America	-7.86E-03	1.87E-02	1	-2.76E-04	3.60E-03	6.68E-03	-7.18E-03
	Northern Asia	-1.87E-02	-1.07E-01	-2.76E-04	1	-1.53E-01	-5.00E-02	-1.55E-02
	Europe	-1.84E-02	3.33E-03	3.60E-03	-1.53E-01	1	-7.09E-02	-3.21E-04
	North America	-3.23E-02	-3.28E-02	6.68E-03	-5.00E-02	-7.09E-02	1	-1.44E-03
	Oceania	1.40E-03	6.14E-05	-7.18E-03	-1.55E-02	-3.21E-04	-1.44E-03	1
Industrial	Africa/Middle East	-6.22E-03	-7.48E-03	-1.30E-03	-5.56E-03	-5.22E-03	-7.51E-03	-1.89E-04
	Southern Asia	1.30E-02	-2.71E-01	5.30E-03	-4.21E-02	1.76E-02	2.54E-02	-6.59E-03
	Central/South America	-7.29E-04	1.65E-03	-2.12E-03	-2.26E-05	3.11E-04	5.51E-04	-6.86E-04
	Northern Asia	-8.18E-03	-6.11E-02	1.57E-03	-7.88E-02	-8.30E-02	-2.95E-02	-1.07E-02
	Europe	-1.73E-02	1.52E-04	3.43E-03	-1.30E-01	-3.88E-01	-6.50E-02	2.75E-04
	North America	-1.61E-02	-1.50E-02	3.15E-03	-2.34E-02	-3.47E-02	-7.68E-02	-8.24E-04
	Oceania	1.33E-04	4.43E-06	-3.80E-04	-1.09E-03	-2.42E-05	-1.52E-04	-1.16E-02
Natural Soil	Africa/Middle East	-7.31E-02	3.25E-03	-4.08E-02	-8.36E-03	-1.37E-02	-4.52E-02	-3.03E-03
	Southern Asia	-8.43E-02	-4.12E-01	-2.32E-02	-3.92E-02	3.05E-03	-7.60E-02	6.42E-02
	Central/South America	3.91E-02	3.99E-02	1.20E-01	3.29E-03	2.92E-02	1.63E-02	-8.81E-03
	Northern Asia	3.66E-02	2.08E-03	4.14E-03	-6.63E-02	-9.65E-03	8.51E-03	-4.55E-02
	Europe	-8.28E-03	-5.84E-03	3.09E-03	-3.94E-02	-9.14E-02	-3.92E-02	6.07E-03
	North America	-3.05E-02	-7.90E-03	8.67E-03	-4.31E-02	-1.01E-01	-2.15E-01	1.26E-02
	Oceania	-1.51E-03	2.92E-02	-1.58E-02	8.91E-03	6.79E-03	1.08E-02	-1.42E-01
Ocean	North Pacific	5.80E-03	-8.33E-02	-6.20E-04	-2.48E-02	3.10E-02	-7.91E-03	-7.26E-04
	South Pacific	-2.43E-02	2.85E-02	-3.22E-02	1.77E-02	2.83E-02	4.60E-03	3.19E-02
	Northern Ocean	9.65E-03	1.32E-02	-2.43E-03	-2.26E-02	-8.40E-02	9.75E-03	1.33E-03
	Atlantic	-3.32E-02	-2.12E-02	-1.58E-02	-3.78E-02	-7.80E-02	-3.85E-02	4.47E-03
	Southern Ocean	6.76E-03	4.71E-02	-8.04E-02	-1.67E-02	3.33E-03	1.81E-02	-2.21E-03
	Indian Ocean	-3.42E-02	-4.76E-02	-4.82E-02	-5.48E-04	7.42E-03	1.75E-02	-5.92E-02
Biomass burning	Africa/Middle East	-2.08E-02	-1.14E-02	-1.42E-02	8.23E-03	6.89E-03	-2.30E-03	6.24E-03
	Southern Asia	-1.27E-02	1.16E-02	-1.64E-02	4.82E-03	6.47E-03	7.71E-03	1.15E-02
	Central/South America	-2.91E-03	7.26E-03	-4.79E-03	1.11E-03	1.20E-03	2.47E-03	2.67E-03
	Northern Asia	2.20E-03	-1.17E-02	-3.26E-04	-2.38E-03	2.65E-03	8.82E-04	1.61E-03
	Europe	2.19E-05	-3.06E-05	6.82E-08	-5.85E-05	-1.98E-04	-2.68E-05	3.86E-05
	North America	2.65E-04	9.61E-04	1.42E-04	1.26E-03	-9.89E-04	-7.04E-04	1.14E-03
	Oceania	-1.32E-03	5.32E-03	-3.26E-03	6.60E-04	1.03E-03	2.56E-03	-2.08E-05

**Fig. S2f.** Correlation of the emissions in 1996 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-6.22E-03	1.30E-02	-7.29E-04	-8.18E-03	-1.73E-02	-1.61E-02	1.33E-04
	Southern Asia	-7.48E-03	-2.71E-01	1.65E-03	-6.11E-02	1.52E-04	-1.50E-02	4.43E-06
	Central/South America	-1.30E-03	5.30E-03	-2.12E-03	1.57E-03	3.43E-03	3.15E-03	-3.80E-04
	Northern Asia	-5.56E-03	-4.21E-02	-2.26E-05	-7.88E-02	-1.30E-01	-2.34E-02	-1.09E-03
	Europe	-5.22E-03	1.76E-02	3.11E-04	-8.30E-02	-3.88E-01	-3.47E-02	-2.42E-05
	North America	-7.51E-03	2.54E-02	5.51E-04	-2.95E-02	-6.50E-02	-7.68E-02	-1.52E-04
Industrial	Oceania	-1.89E-04	-6.59E-03	-6.86E-04	-1.07E-02	2.75E-04	-8.24E-04	-1.16E-02
	Africa/Middle East	1	1.84E-03	-1.22E-04	-2.83E-03	-4.86E-03	-3.74E-03	-5.14E-06
	Southern Asia	1.84E-03	1	5.02E-04	-4.68E-02	1.63E-02	1.29E-02	-4.15E-04
	Central/South America	-1.22E-04	5.02E-04	1	1.35E-04	2.97E-04	2.58E-04	-3.53E-05
	Northern Asia	-2.83E-03	-4.68E-02	1.35E-04	1	-7.65E-02	-1.38E-02	-5.88E-04
	Europe	-4.86E-03	1.63E-02	2.97E-04	-7.65E-02	1	-3.09E-02	1.66E-05
Natural Soil	North America	-3.74E-03	1.29E-02	2.58E-04	-1.38E-02	-3.09E-02	1	-8.05E-05
	Oceania	-5.14E-06	-4.15E-04	-3.53E-05	-5.88E-04	1.66E-05	-8.05E-05	1
	Africa/Middle East	-1.28E-02	5.43E-02	-3.68E-03	3.88E-03	-1.38E-02	-2.26E-02	9.85E-07
	Southern Asia	-1.45E-02	-1.49E-01	-2.05E-03	-3.01E-02	-1.53E-03	-3.40E-02	4.10E-03
	Central/South America	-5.29E-03	2.43E-03	-1.03E-02	1.23E-02	2.69E-02	1.08E-02	7.84E-06
	Northern Asia	8.73E-03	-3.55E-02	3.56E-04	-5.10E-02	-3.08E-02	3.48E-03	-3.17E-03
Ocean	Europe	-1.96E-03	1.56E-02	2.68E-04	-2.20E-02	-7.88E-02	-1.77E-02	4.09E-04
	North America	-6.22E-03	8.72E-02	7.45E-04	-1.86E-02	-8.62E-02	-1.16E-01	7.58E-04
	Oceania	-4.43E-04	6.78E-03	-1.48E-03	-4.19E-03	7.68E-03	5.09E-03	-8.51E-03
	North Pacific	1.25E-04	-1.17E-02	1.16E-05	-7.61E-03	2.21E-02	-4.44E-03	-3.68E-05
	South Pacific	-3.47E-03	2.17E-02	-3.05E-03	1.81E-02	2.58E-02	3.02E-03	2.15E-03
	Northern Ocean	1.72E-03	-3.78E-03	-2.01E-04	-1.20E-02	5.27E-02	2.68E-03	1.20E-04
Biomass burning	Atlantic	-6.50E-03	-4.35E-03	-1.42E-03	-2.32E-02	-6.01E-02	-2.07E-02	2.92E-04
	Southern Ocean	3.36E-05	-2.86E-02	-7.01E-03	-8.42E-03	2.38E-03	8.59E-03	-7.93E-04
	Indian Ocean	-5.72E-03	3.94E-02	-4.55E-03	1.57E-02	8.45E-03	7.74E-03	-3.92E-03
	Africa/Middle East	3.22E-03	1.76E-02	-1.30E-03	8.49E-03	5.90E-03	-1.03E-03	4.73E-04
	Southern Asia	-2.07E-03	1.45E-02	-1.47E-03	6.74E-03	6.25E-03	3.21E-03	7.50E-04
	Central/South America	-4.93E-04	4.62E-03	-4.25E-04	1.60E-03	1.20E-03	1.08E-03	1.74E-04

**Fig. S2g.** Correlation of the emissions in 1996 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-7.31E-02	-8.43E-02	-3.91E-02	3.66E-02	-8.28E-03	-3.05E-02	-1.51E-03
	Southern Asia	3.25E-03	-4.12E-01	3.99E-02	2.08E-03	-5.84E-03	-7.90E-03	2.92E-02
	Central/South America	-4.08E-02	-2.32E-02	-1.20E-01	4.14E-03	3.09E-03	8.67E-03	-1.58E-02
	Northern Asia	-8.36E-03	-3.92E-02	3.29E-03	-6.63E-02	-3.94E-02	-4.31E-02	-8.91E-03
	Europe	-1.37E-02	3.05E-03	2.92E-02	-9.65E-03	-9.14E-02	-1.01E-01	6.79E-03
	North America	-4.52E-02	-7.60E-02	1.63E-02	8.51E-03	-3.92E-02	-2.15E-01	1.08E-02
Industrial	Oceania	-3.03E-03	6.42E-02	-8.81E-03	-4.55E-03	6.07E-03	1.26E-02	-1.42E-01
	Africa/Middle East	-1.28E-02	-1.45E-02	-5.29E-03	8.73E-03	-1.96E-03	-6.22E-03	-4.43E-04
	Southern Asia	5.43E-02	-1.49E-01	2.43E-03	-3.55E-02	1.56E-02	8.72E-02	6.78E-03
	Central/South America	-3.68E-03	-2.05E-03	-1.03E-02	3.56E-04	2.68E-04	7.45E-04	-1.48E-03
	Northern Asia	3.88E-03	-3.01E-02	1.23E-02	-5.10E-02	-2.20E-02	-1.86E-02	-4.19E-03
	Europe	-1.38E-02	-1.53E-03	2.69E-02	-3.08E-02	-7.88E-02	-8.62E-02	7.68E-03
Natural Soil	North America	-2.26E-02	-3.40E-02	1.08E-02	3.48E-03	-1.77E-02	-1.16E-01	5.09E-03
	Oceania	9.85E-07	4.10E-03	7.84E-06	-3.17E-03	4.09E-04	7.58E-04	-8.51E-03
	Africa/Middle East	1	-2.73E-01	-2.32E-01	6.00E-02	-1.66E-02	-9.56E-02	-1.94E-02
	Southern Asia	-2.73E-01	1	-1.20E-01	-1.71E-01	-1.31E-02	-2.07E-01	-1.84E-03
	Central/South America	-2.32E-01	-1.20E-01	1	-8.61E-02	3.51E-03	-1.47E-02	-1.14E-02
	Northern Asia	6.00E-02	-1.71E-01	-8.61E-02	1	-1.51E-01	-2.54E-01	-5.71E-02
Ocean	Europe	-1.66E-02	-1.31E-02	3.51E-03	-1.51E-01	1	-1.24E-01	1.28E-02
	North America	-9.56E-02	-2.07E-01	-1.47E-02	-2.54E-01	-1.24E-01	1	3.26E-02
	Oceania	-1.94E-02	-1.84E-03	-1.14E-02	-5.71E-02	1.28E-02	3.26E-02	1
	North Pacific	4.23E-02	9.95E-02	-9.29E-05	-7.79E-02	3.56E-02	5.51E-02	-3.27E-04
	South Pacific	-8.39E-02	-6.12E-02	-5.10E-01	1.29E-02	2.48E-02	5.51E-02	-2.37E-02
	Northern Ocean	2.66E-02	8.89E-02	1.41E-02	-4.20E-02	5.66E-03	2.94E-02	-3.75E-03
Biomass burning	Atlantic	-7.08E-02	2.96E-02	-4.74E-02	7.74E-02	1.24E-02	6.55E-02	-1.12E-02
	Southern Ocean	3.44E-02	2.13E-01	3.00E-02	-3.95E-02	1.50E-03	2.53E-02	-3.28E-03
	Indian Ocean	-1.02E-01	-1.66E-01	-1.34E-01	1.76E-02	1.09E-02	4.04E-02	-5.62E-02
	Africa/Middle East	6.69E-02	-5.22E-02	-4.03E-02	2.64E-02	2.93E-03	1.69E-03	-9.03E-03
	Southern Asia	-4.35E-02	-9.91E-02	6.43E-03	3.62E-02	8.54E-03	2.41E-02	-2.04E-02
	Central/South America	-1.12E-02	-1.73E-02	-2.53E-03	7.86E-03	1.23E-03	2.43E-03	-4.64E-03

**Fig. S2h.** Correlation of the emissions in 1996 for natural soil.

Source sector	Region	Ocean						
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean	
Agricultural Soil	Africa/Middle East	5.80E-03	-2.43E-02	9.65E-03	-3.32E-02	6.76E-03	-3.42E-02	
	Southern Asia	-8.33E-02	2.85E-02	1.32E-02	-2.12E-02	4.71E-02	-4.76E-02	
	Central/South America	-6.20E-04	-3.22E-02	-2.43E-03	-1.58E-02	-8.04E-02	-4.82E-02	
	Northern Asia	-2.48E-02	1.77E-02	-2.26E-02	-3.78E-02	-1.67E-02	-5.48E-04	
	Europe	3.10E-02	2.83E-02	-8.40E-02	-7.80E-02	3.33E-03	7.42E-03	
	North America	-7.91E-03	4.60E-03	9.75E-03	-3.85E-02	1.81E-02	1.75E-02	
	Oceania	-7.26E-04	3.19E-02	1.33E-03	4.47E-03	-2.21E-03	-5.92E-02	
Industrial	Africa/Middle East	1.25E-04	-3.47E-03	1.72E-03	-6.50E-03	3.36E-05	5.72E-03	
	Southern Asia	-1.17E-02	2.17E-02	-3.78E-03	-4.35E-03	-2.86E-02	3.94E-02	
	Central/South America	1.16E-05	-3.05E-03	-2.01E-04	-1.42E-03	-7.01E-03	4.55E-03	
	Northern Asia	-7.61E-03	1.81E-02	-1.20E-02	-2.32E-02	-8.42E-03	1.57E-02	
	Europe	2.21E-02	2.58E-02	-5.27E-02	-6.01E-02	2.38E-03	8.45E-03	
	North America	-4.44E-03	3.02E-03	2.68E-03	-2.07E-02	8.59E-03	7.74E-03	
	Oceania	-3.68E-05	2.15E-03	1.20E-04	2.92E-04	-7.93E-04	-3.92E-03	
Natural Soil	Africa/Middle East	4.23E-02	-8.39E-02	2.66E-02	-7.08E-02	3.44E-02	-1.02E-01	
	Southern Asia	9.95E-02	-6.12E-02	8.89E-02	2.96E-02	2.13E-01	-1.66E-01	
	Central/South America	-9.29E-05	-5.10E-01	1.41E-02	-4.74E-02	3.00E-02	1.34E-01	
	Northern Asia	-7.79E-02	1.29E-02	-4.20E-02	7.74E-02	-3.95E-02	1.76E-02	
	Europe	3.56E-02	2.48E-02	5.66E-03	1.24E-02	1.50E-03	1.09E-02	
	North America	5.51E-02	5.51E-02	2.94E-02	6.55E-02	2.53E-02	4.04E-02	
	Oceania	-3.27E-04	-2.37E-02	-3.75E-03	-1.12E-02	-3.28E-03	-5.62E-02	
Ocean	North Pacific		1	3.43E-02	-2.40E-02	-5.81E-02	-1.27E-02	2.76E-02
	South Pacific	3.43E-02		1	1.43E-02	-4.87E-02	1.54E-02	-3.39E-02
	Northern Ocean	-2.40E-02	1.43E-02		1	-1.09E-01	3.87E-04	-3.42E-03
	Atlantic	-5.81E-02	-4.87E-02	-1.09E-01		1	-9.10E-02	-3.59E-02
	Southern Ocean	-1.27E-02	1.54E-02	3.87E-04	-9.10E-02		1	-6.15E-01
	Indian Ocean	2.76E-02	-3.39E-02	-3.42E-03	-3.59E-02	-6.15E-01		1
Biomass burning	Africa/Middle East	1.33E-02	-6.22E-02	3.34E-03	-3.81E-02	-1.60E-02	-3.74E-02	
	Southern Asia	-1.67E-03	-2.23E-02	-4.91E-03	-2.62E-02	-3.65E-03	-1.34E-02	
	Central/South America	9.00E-04	-1.75E-02	-1.15E-03	-6.75E-03	-1.82E-02	-6.52E-03	
	Northern Asia	-3.80E-02	2.65E-03	-1.63E-03	-1.69E-04	-4.22E-03	6.38E-03	
	Europe	-1.08E-05	9.61E-05	-2.83E-04	-1.55E-04	-7.90E-06	3.75E-05	
	North America	1.58E-04	1.05E-03	-3.48E-03	1.10E-03	9.34E-04	7.15E-04	
	Oceania	2.34E-04	-3.85E-03	-1.33E-03	-3.82E-03	-5.16E-03	-5.17E-03	

**Fig. S2i.** Correlation of the emissions in 1996 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.08E-02	-1.27E-02	-2.91E-03	2.20E-03	2.19E-05	2.65E-04	-1.32E-03
	Southern Asia	-1.14E-02	1.16E-02	7.26E-03	-1.17E-02	-3.06E-05	9.61E-04	5.32E-03
	Central/South America	-1.42E-02	-1.64E-02	-4.79E-03	-3.26E-04	6.82E-08	1.42E-04	-3.26E-03
	Northern Asia	8.23E-03	4.82E-03	1.11E-03	-2.38E-03	-5.85E-05	1.26E-03	6.60E-04
	Europe	6.89E-03	6.47E-03	1.20E-03	2.65E-03	-1.98E-04	-9.89E-04	1.03E-03
	North America	-2.30E-03	7.71E-03	2.47E-03	8.82E-04	-2.68E-05	-7.04E-04	2.56E-03
Industrial	Oceania	6.24E-03	1.15E-02	2.67E-03	1.61E-03	3.86E-05	1.14E-03	-2.08E-05
	Africa/Middle East	-3.22E-03	-2.07E-03	-4.93E-04	4.87E-04	3.38E-06	1.25E-04	-2.09E-04
	Southern Asia	1.76E-02	1.45E-02	4.62E-03	-1.56E-02	1.87E-05	1.74E-03	2.55E-03
	Central/South America	-1.30E-03	-1.47E-03	-4.25E-04	-2.96E-05	-3.42E-07	1.23E-05	-2.91E-04
	Northern Asia	8.49E-03	6.74E-03	1.60E-03	-3.65E-03	-6.46E-05	8.83E-04	8.93E-04
	Europe	5.90E-03	6.25E-03	1.20E-03	2.27E-03	-2.36E-04	1.09E-04	1.03E-03
Natural Soil	North America	-1.03E-03	3.21E-03	1.08E-03	8.08E-04	-7.07E-06	-3.59E-04	1.18E-03
	Oceania	4.73E-04	7.50E-04	1.74E-04	1.14E-04	2.47E-06	7.67E-05	1.46E-05
	Africa/Middle East	-6.69E-02	-4.35E-02	-1.12E-02	3.52E-03	6.98E-05	-4.51E-04	-5.41E-03
	Southern Asia	-5.22E-02	-9.91E-02	-1.73E-02	-1.96E-03	3.28E-04	4.22E-03	-1.03E-02
	Central/South America	-4.03E-02	6.43E-03	-2.53E-03	7.46E-04	4.49E-06	-2.29E-03	-1.79E-03
	Northern Asia	2.64E-02	3.62E-02	7.86E-03	-4.22E-02	-9.27E-04	-2.15E-02	3.57E-03
Ocean	Europe	2.93E-03	8.54E-03	1.23E-03	-2.56E-03	-1.40E-04	-2.88E-03	1.15E-03
	North America	1.69E-03	2.41E-02	2.43E-03	-1.96E-03	-3.10E-04	-1.08E-02	3.66E-03
	Oceania	-9.03E-03	-2.04E-02	-4.64E-03	5.51E-04	4.08E-05	1.28E-03	5.64E-03
	North Pacific	1.33E-02	-1.67E-03	9.00E-04	-3.80E-02	-1.08E-05	1.58E-04	2.34E-04
	South Pacific	-6.22E-02	-2.23E-02	-1.75E-02	2.65E-03	9.61E-05	1.05E-03	-3.85E-03
	Northern Ocean	3.34E-03	-4.91E-03	-1.15E-03	-1.63E-03	-2.83E-04	-3.48E-03	-1.33E-03
Biomass burning	Atlantic	-3.81E-02	-2.62E-02	-6.75E-03	-1.69E-04	-1.55E-04	1.10E-03	-3.82E-03
	Southern Ocean	-1.60E-02	-3.65E-03	-1.82E-02	-4.22E-03	-7.90E-06	9.34E-04	-5.16E-03
	Indian Ocean	-3.74E-02	-1.34E-02	-6.52E-03	6.38E-03	3.75E-05	7.15E-04	-5.17E-03
	Africa/Middle East	1	-2.76E-02	-8.01E-03	-3.40E-05	2.32E-05	2.53E-04	-4.14E-03
	Southern Asia	-2.76E-02	1	-9.99E-03	-4.73E-03	1.26E-05	6.32E-04	-7.42E-03
	Central/South America	-8.01E-03	-9.99E-03	1	-2.09E-04	1.69E-06	5.21E-05	-1.92E-03

**Fig. S2j.** Correlation of the emissions in 1996 for biomass burning.

Source sector	Region	Agricultural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1	-7.03E-02	-2.69E-03	-3.64E-02	-2.69E-02	-4.10E-02	4.98E-03
	Southern Asia	-7.03E-02	1	2.67E-02	-1.67E-01	2.69E-02	-7.29E-02	1.97E-02
	Central/South America	-2.69E-03	2.67E-02	1	-1.32E-03	2.94E-03	1.15E-02	-1.12E-02
	Northern Asia	-3.64E-02	-1.67E-01	-1.32E-03	1	-1.75E-01	-5.11E-02	-1.33E-02
	Europe	-2.69E-02	2.69E-02	2.94E-03	-1.75E-01	1	-2.34E-02	2.55E-03
	North America	-4.10E-02	-7.29E-02	1.15E-02	-5.11E-02	-2.34E-02	1	3.50E-03
	Oceania	4.98E-03	1.97E-02	1.12E-02	-1.33E-02	2.55E-03	3.50E-03	1
Industrial	Africa/Middle East	-2.82E-02	-1.33E-02	-9.82E-05	-9.12E-03	-9.84E-03	-8.73E-03	5.04E-04
	Southern Asia	9.69E-03	-3.67E-01	3.25E-05	-2.60E-02	1.52E-02	1.27E-02	-1.65E-03
	Central/South America	-2.78E-04	2.40E-03	-3.44E-03	-1.23E-04	2.55E-04	1.02E-03	-1.14E-03
	Northern Asia	1.67E-02	-1.50E-02	-4.89E-03	-7.50E-02	-4.41E-02	4.74E-02	-1.07E-02
	Europe	-1.94E-02	-1.86E-03	2.79E-03	-8.79E-02	-6.84E-01	-2.83E-02	2.01E-03
	North America	-4.47E-03	1.08E-03	3.44E-03	2.68E-02	1.36E-02	-2.11E-01	1.19E-03
	Oceania	3.35E-04	1.25E-03	-6.01E-04	-9.96E-04	1.85E-04	1.72E-04	-1.74E-02
Natural Soil	Africa/Middle East	-1.43E-01	-6.38E-02	-5.53E-02	-2.35E-02	-1.58E-02	-4.80E-02	-9.68E-05
	Southern Asia	-6.19E-02	-3.87E-01	1.26E-02	-2.81E-02	3.45E-03	-4.48E-02	5.52E-02
	Central/South America	5.11E-02	5.44E-02	1.75E-01	1.83E-02	2.10E-02	1.16E-02	-4.06E-02
	Northern Asia	3.01E-02	-7.88E-03	5.63E-03	-1.69E-01	1.47E-02	3.23E-02	-5.45E-02
	Europe	-1.12E-02	4.20E-03	3.22E-03	1.29E-03	-2.67E-01	1.19E-02	1.33E-02
	North America	-3.80E-02	-2.96E-02	1.15E-02	2.44E-02	1.31E-02	-3.96E-01	2.57E-02
	Oceania	4.66E-03	2.80E-02	-9.87E-03	-6.14E-03	4.26E-03	9.14E-03	-1.46E-01
Ocean	North Pacific	-6.26E-03	-1.30E-01	7.35E-03	-7.06E-03	1.09E-02	-3.16E-02	2.33E-02
	South Pacific	-2.55E-02	-7.86E-04	-3.84E-02	1.83E-02	1.19E-02	1.32E-02	1.41E-02
	Northern Ocean	1.51E-02	-5.23E-03	2.30E-03	-5.69E-02	-3.80E-02	-8.57E-03	7.72E-03
	Atlantic	-5.28E-02	-1.06E-01	-9.89E-03	-6.52E-02	-4.05E-02	-1.25E-01	2.50E-02
	Southern Ocean	2.46E-02	8.58E-02	-1.26E-01	-5.93E-03	3.13E-03	3.09E-02	-1.62E-02
	Indian Ocean	-1.85E-02	-3.75E-02	-5.71E-02	1.56E-03	2.30E-03	2.80E-02	-4.35E-02
Biomass burning	Africa/Middle East	-2.46E-02	-2.88E-02	1.91E-02	9.71E-03	2.43E-03	-2.59E-03	7.91E-03
	Southern Asia	-1.87E-03	-2.38E-02	-1.35E-02	-1.94E-02	9.21E-03	2.08E-02	1.32E-02
	Central/South America	-2.28E-03	3.47E-03	-7.59E-03	1.33E-03	6.38E-04	3.56E-03	1.99E-03
	Northern Asia	4.07E-04	-2.00E-02	5.47E-04	-3.72E-03	4.39E-03	-7.44E-04	4.29E-03
	Europe	2.88E-05	-2.71E-05	9.34E-06	-2.84E-04	5.08E-05	-4.16E-05	9.24E-05
	North America	3.07E-04	6.42E-04	5.44E-04	2.55E-03	1.06E-03	1.19E-03	1.58E-03
	Oceania	2.32E-04	3.67E-03	-3.62E-03	-6.85E-04	9.00E-04	3.96E-03	-5.38E-04

**Fig. S2k.** Correlation of the emissions in 1997 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.82E-02	9.69E-03	-2.78E-04	1.67E-02	-1.94E-02	-4.47E-03	3.35E-04
	Southern Asia	-1.33E-02	-3.67E-01	2.40E-03	-1.50E-02	-1.86E-03	1.08E-03	1.25E-03
	Central/South America	-9.82E-05	3.25E-05	-3.44E-03	-4.89E-03	2.79E-03	3.44E-03	-6.01E-04
	Northern Asia	-9.12E-03	-2.60E-02	-1.23E-04	-7.50E-02	-8.79E-02	2.68E-02	-9.96E-04
	Europe	-9.84E-03	1.52E-02	2.55E-04	-4.41E-02	-6.84E-01	1.36E-02	1.85E-04
	North America	-8.73E-03	1.27E-02	1.02E-03	4.74E-02	-2.83E-02	-2.11E-01	1.72E-02
Industrial	Oceania	5.04E-04	-1.65E-03	-1.14E-03	-1.07E-02	2.01E-03	1.19E-03	-1.74E-02
	Africa/Middle East	1	1.38E-03	-1.49E-05	1.83E-03	-5.63E-03	-8.85E-04	3.29E-05
	Southern Asia	1.38E-03	1	2.64E-05	-4.66E-02	7.77E-03	1.13E-02	-1.03E-04
	Central/South America	-1.49E-05	2.64E-05	1	-4.13E-04	2.41E-04	3.11E-04	-6.47E-05
	Northern Asia	1.83E-03	-4.66E-02	-4.13E-04	1	-2.28E-02	-3.10E-01	-5.93E-04
	Europe	-5.63E-03	7.77E-03	2.41E-04	-2.28E-02	1	6.66E-03	1.38E-04
Natural Soil	North America	-8.85E-04	1.13E-02	3.11E-04	-3.10E-01	6.66E-03	1	5.36E-05
	Oceania	3.29E-05	-1.03E-04	-6.47E-05	-5.93E-04	1.38E-04	5.36E-05	1
	Africa/Middle East	-2.45E-02	5.04E-02	-5.10E-03	6.33E-02	-1.31E-02	8.68E-04	7.92E-05
	Southern Asia	-1.04E-02	-1.34E-01	1.06E-03	4.57E-02	-5.49E-04	5.83E-03	3.70E-03
	Central/South America	-6.24E-03	8.30E-03	-1.51E-02	1.78E-02	1.41E-02	3.32E-03	-1.97E-03
	Northern Asia	6.62E-03	-2.98E-02	5.29E-04	-4.78E-02	1.13E-03	3.54E-02	-3.51E-03
Ocean	Europe	-4.57E-03	1.15E-02	2.76E-04	2.35E-02	-1.92E-01	2.09E-02	8.41E-04
	North America	-5.72E-03	7.07E-02	9.79E-04	-1.91E-01	-1.87E-02	-2.51E-01	1.51E-03
	Oceania	7.28E-04	1.63E-03	-9.85E-04	-1.08E-02	3.67E-03	2.60E-03	-9.86E-03
	North Pacific	-2.99E-03	-3.50E-02	7.00E-04	1.69E-02	-1.10E-02	-5.92E-03	1.58E-03
	South Pacific	-2.89E-03	1.56E-02	-3.89E-03	8.20E-04	1.27E-02	-1.27E-03	1.12E-03
	Northern Ocean	3.63E-03	-5.19E-03	2.45E-04	1.24E-02	6.82E-03	5.90E-03	5.65E-04
Biomass burning	Atlantic	-8.43E-03	-2.58E-02	-9.32E-04	-9.37E-02	-1.72E-02	-6.60E-02	1.72E-03
	Southern Ocean	2.96E-03	-2.91E-02	-9.66E-03	-1.01E-02	5.67E-04	1.10E-02	-1.66E-03
	Indian Ocean	-2.50E-03	3.06E-02	-5.61E-03	-1.17E-02	5.34E-03	1.87E-03	-2.97E-03
	Africa/Middle East	3.33E-03	4.72E-03	1.75E-03	1.06E-02	2.45E-03	2.61E-04	5.44E-04
	Southern Asia	6.35E-04	1.26E-02	-1.21E-03	-1.98E-02	9.26E-03	5.10E-03	1.04E-03
	Central/South America	-2.20E-04	1.37E-03	-6.91E-04	1.44E-04	7.43E-04	1.22E-03	1.37E-04

**Fig. S21.** Correlation of the emissions in 1997 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.43E-01	-6.19E-02	-5.11E-02	3.01E-02	-1.12E-02	-3.80E-02	4.66E-03
	Southern Asia	-6.38E-02	-3.87E-01	5.44E-02	-7.88E-03	4.20E-03	-2.96E-02	2.80E-02
	Central/South America	-5.53E-02	1.26E-02	-1.75E-01	5.63E-03	3.22E-03	1.15E-02	-9.87E-03
	Northern Asia	-2.35E-02	-2.81E-02	1.83E-02	-1.69E-01	1.29E-03	2.44E-02	-6.14E-03
	Europe	-1.58E-02	3.45E-03	2.10E-02	1.47E-02	-2.67E-01	1.31E-02	4.26E-03
	North America	-4.80E-02	-4.48E-02	1.16E-02	3.23E-02	1.19E-02	-3.96E-01	9.14E-03
Industrial	Oceania	-9.68E-05	5.52E-02	-4.06E-02	-5.45E-02	1.33E-02	2.57E-02	-1.46E-01
	Africa/Middle East	-2.45E-02	-1.04E-02	-6.24E-03	6.62E-03	-4.57E-03	-5.72E-03	7.28E-04
	Southern Asia	5.04E-02	-1.34E-01	8.30E-03	-2.98E-02	1.15E-02	7.07E-02	1.63E-03
	Central/South America	-5.10E-03	1.06E-03	-1.51E-02	5.29E-04	2.76E-04	9.79E-04	-9.85E-04
	Northern Asia	6.33E-02	4.57E-02	1.78E-02	-4.78E-02	2.35E-02	-1.91E-01	-1.08E-02
	Europe	-1.31E-02	-5.49E-04	1.41E-02	1.13E-03	-1.92E-01	-1.87E-02	3.67E-03
Natural Soil	North America	8.68E-04	5.83E-03	3.32E-03	3.54E-02	2.09E-02	-2.51E-01	2.60E-03
	Oceania	7.92E-05	3.70E-03	-1.97E-03	-3.51E-03	8.41E-04	1.51E-03	-9.86E-03
	Africa/Middle East	1	-2.31E-01	-3.09E-01	1.41E-01	-1.02E-02	-1.31E-01	4.04E-04
	Southern Asia	-2.31E-01	1	-6.60E-02	-3.65E-01	4.94E-02	-3.07E-02	1.86E-02
	Central/South America	-3.09E-01	-6.60E-02	1	-8.91E-02	-1.52E-02	-1.80E-02	-6.61E-02
	Northern Asia	1.41E-01	-3.65E-01	-8.91E-02	1	-1.87E-01	-2.89E-01	-5.83E-02
Ocean	Europe	-1.02E-02	4.94E-02	-1.52E-02	-1.87E-01	1	-7.40E-02	9.42E-03
	North America	-1.31E-01	-3.07E-02	-1.80E-02	-2.89E-01	-7.40E-02	1	2.67E-02
	Oceania	4.04E-04	1.86E-02	-6.61E-02	-5.83E-02	9.42E-03	2.67E-02	1
	North Pacific	8.53E-02	1.43E-01	1.91E-02	-2.66E-01	7.60E-02	9.33E-02	2.20E-02
	South Pacific	-1.06E-01	-4.27E-02	-4.02E-01	-1.09E-02	7.08E-03	4.98E-02	-3.75E-02
	Northern Ocean	6.28E-02	1.01E-01	3.78E-02	-8.42E-02	7.42E-03	-3.63E-03	8.94E-03
Biomass burning	Atlantic	-8.51E-02	1.18E-01	-4.67E-02	4.14E-02	4.37E-02	2.03E-02	1.71E-02
	Southern Ocean	8.80E-02	2.30E-01	-1.03E-01	-4.27E-02	1.19E-02	4.27E-02	-3.96E-03
	Indian Ocean	-8.68E-02	-1.45E-01	-2.05E-01	2.27E-02	7.61E-03	4.75E-02	-3.25E-02
	Africa/Middle East	-1.12E-01	3.92E-03	6.51E-02	2.12E-02	-1.20E-03	-3.40E-03	8.20E-04
	Southern Asia	-7.32E-02	-8.79E-02	6.71E-03	5.90E-02	3.19E-03	3.39E-02	-1.42E-03
	Central/South America	-2.12E-02	-9.16E-04	-1.84E-03	7.45E-03	5.30E-04	2.02E-03	-1.53E-03

**Fig. S2m.** Correlation of the emissions in 1997 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-6.26E-03	-2.55E-02	1.51E-02	-5.28E-02	2.46E-02	-1.85E-02
	Southern Asia	-1.30E-01	-7.86E-04	-5.23E-03	-1.06E-01	8.58E-02	-3.75E-02
	Central/South America	7.35E-03	-3.84E-02	2.30E-03	-9.89E-03	-1.26E-01	-5.71E-02
	Northern Asia	-7.06E-03	1.83E-02	-5.69E-02	-6.52E-02	-5.93E-03	1.56E-03
	Europe	1.09E-02	1.19E-02	-3.80E-02	-4.05E-02	3.13E-03	2.30E-03
	North America	-3.16E-02	1.32E-02	-8.57E-03	-1.25E-01	3.09E-02	2.80E-02
	Oceania	2.33E-02	1.41E-02	7.72E-03	2.50E-02	-1.62E-02	-4.35E-02
Industrial	Africa/Middle East	-2.99E-03	-2.89E-03	3.63E-03	-8.43E-03	2.96E-03	-2.50E-03
	Southern Asia	-3.50E-02	1.56E-02	-5.19E-03	-2.58E-02	-2.91E-02	3.06E-02
	Central/South America	7.00E-04	-3.89E-03	2.45E-04	-9.32E-04	-9.66E-03	5.61E-03
	Northern Asia	1.69E-02	8.20E-04	1.24E-02	-9.37E-02	-1.01E-02	-1.17E-02
	Europe	-1.10E-02	1.27E-02	6.82E-03	-1.72E-02	5.67E-04	5.34E-03
	North America	-5.92E-03	-1.27E-03	5.90E-03	-6.60E-02	1.10E-02	1.87E-03
	Oceania	1.58E-03	1.12E-03	5.65E-04	1.72E-03	-1.66E-03	-2.97E-03
Natural Soil	Africa/Middle East	8.53E-02	-1.06E-01	6.28E-02	-8.51E-02	8.80E-02	-8.68E-02
	Southern Asia	1.43E-01	-4.27E-02	1.01E-01	1.18E-01	2.30E-01	-1.45E-01
	Central/South America	1.91E-02	-4.02E-01	3.78E-02	-4.67E-02	-1.03E-01	-2.05E-01
	Northern Asia	-2.66E-01	-1.09E-02	-8.42E-02	4.14E-02	-4.27E-02	4.27E-02
	Europe	7.60E-02	7.08E-03	7.42E-03	4.37E-02	1.19E-02	7.61E-03
	North America	9.33E-02	4.98E-02	-3.63E-03	2.03E-02	4.27E-02	4.75E-02
	Oceania	2.20E-02	-3.75E-02	8.94E-03	1.71E-02	-3.96E-03	-3.25E-02
Ocean	North Pacific	1	-3.18E-03	-3.75E-02	-1.83E-01	2.64E-02	4.17E-02
	South Pacific	-3.18E-03	1	3.97E-03	-6.36E-02	-8.81E-03	-9.51E-02
	Northern Ocean	-3.75E-02	3.97E-03	1	-2.71E-01	2.75E-02	2.02E-03
	Atlantic	-1.83E-01	-6.36E-02	-2.71E-01	1	-7.17E-02	-1.14E-02
	Southern Ocean	2.64E-02	-8.81E-03	2.75E-02	-7.17E-02	1	-5.71E-01
	Indian Ocean	4.17E-02	-9.51E-02	2.02E-03	-1.14E-02	-5.71E-01	1
Biomass burning	Africa/Middle East	2.54E-04	-7.19E-02	5.34E-03	-7.03E-02	2.81E-03	-2.51E-02
	Southern Asia	-4.40E-03	-3.11E-02	-1.22E-02	-2.84E-02	8.33E-02	-7.72E-02
	Central/South America	1.55E-05	-2.06E-02	1.06E-04	-1.22E-02	-2.24E-02	-5.29E-03
	Northern Asia	-3.74E-02	-8.38E-05	-3.48E-03	-5.88E-03	5.98E-03	4.56E-03
	Europe	1.27E-04	3.49E-05	-3.55E-04	-4.22E-04	9.73E-05	-6.93E-06
	North America	2.03E-03	3.31E-04	-8.04E-03	-1.92E-03	2.28E-03	1.02E-03
	Oceania	7.06E-04	-1.08E-02	-1.53E-03	-3.63E-03	4.61E-03	-8.76E-03

**Fig. S2n.** Correlation of the emissions in 1997 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.46E-02	-1.87E-03	-2.28E-03	4.07E-04	2.88E-05	3.07E-04	2.32E-04
	Southern Asia	-2.88E-02	-2.38E-02	3.47E-03	-2.00E-02	-2.71E-05	6.42E-04	3.67E-03
	Central/South America	-1.91E-02	-1.35E-02	-7.59E-03	5.47E-04	9.34E-06	5.44E-04	-3.62E-03
	Northern Asia	9.71E-03	-1.94E-02	1.33E-03	-3.72E-03	-2.84E-04	2.55E-03	-6.85E-04
	Europe	2.43E-03	9.21E-03	6.38E-04	4.39E-03	5.08E-05	1.06E-03	9.00E-04
	North America	-2.59E-03	2.08E-02	3.56E-03	-7.44E-04	-4.16E-05	1.19E-03	3.96E-03
Industrial	Oceania	7.91E-03	1.32E-02	1.99E-03	4.29E-03	9.24E-05	1.58E-03	-5.38E-04
	Africa/Middle East	-3.33E-03	6.35E-04	-2.20E-04	3.55E-05	7.26E-06	1.60E-04	1.60E-04
	Southern Asia	4.72E-03	1.26E-02	1.37E-03	-1.58E-02	3.14E-05	1.61E-03	2.10E-03
	Central/South America	-1.75E-03	-1.21E-03	-6.91E-04	5.33E-05	6.86E-07	4.85E-05	-3.26E-04
	Northern Asia	1.06E-02	-1.98E-02	1.44E-04	-1.48E-03	6.98E-05	-2.86E-04	-2.18E-03
	Europe	2.45E-03	9.26E-03	7.43E-04	8.32E-04	-3.09E-05	7.20E-04	1.02E-03
Natural Soil	North America	2.61E-04	5.10E-03	1.22E-03	2.11E-03	6.62E-05	3.61E-04	9.98E-04
	Oceania	5.44E-04	1.04E-03	1.37E-04	2.97E-04	6.11E-06	1.00E-04	8.73E-08
	Africa/Middle East	-1.12E-01	-7.32E-02	-2.12E-02	8.31E-03	9.36E-05	1.60E-03	-8.17E-03
	Southern Asia	3.92E-03	-8.79E-02	-9.16E-04	1.22E-02	5.80E-04	6.38E-03	-9.15E-03
	Central/South America	-6.51E-02	6.71E-03	-1.84E-03	-5.16E-03	1.01E-04	-2.85E-03	-1.60E-03
	Northern Asia	2.12E-02	5.90E-02	7.45E-03	-5.17E-02	-1.18E-03	-1.98E-02	6.10E-03
Ocean	Europe	-1.20E-03	3.19E-03	5.30E-04	-5.85E-03	-1.49E-03	-6.34E-03	5.64E-04
	North America	-3.40E-03	3.39E-02	2.02E-03	-1.01E-03	-3.53E-05	-1.79E-02	4.59E-03
	Oceania	8.20E-04	-1.42E-03	-1.53E-03	1.76E-03	8.98E-05	1.04E-03	-3.10E-03
	North Pacific	2.54E-04	-4.40E-03	1.55E-05	-3.74E-02	1.27E-04	2.03E-03	7.06E-04
	South Pacific	-7.19E-02	-3.11E-02	-2.06E-02	-8.38E-05	3.49E-05	3.31E-04	-1.08E-02
	Northern Ocean	5.34E-03	-1.22E-02	1.06E-04	-3.48E-03	-3.55E-04	-8.04E-03	-1.53E-03
Biomass burning	Atlantic	-7.03E-02	-2.84E-02	-1.22E-02	-5.88E-03	-4.22E-04	-1.92E-03	-3.63E-03
	Southern Ocean	2.81E-03	8.33E-02	-2.24E-02	5.98E-03	9.73E-05	2.28E-03	4.61E-03
	Indian Ocean	-2.51E-02	-7.72E-02	-5.29E-03	4.56E-06	-6.93E-06	1.02E-03	-8.76E-03
	Africa/Middle East	1	-2.69E-02	-1.41E-02	-7.75E-04	2.71E-06	4.52E-04	-4.52E-03
	Southern Asia	-2.69E-02	1	-1.34E-02	-1.91E-02	-4.22E-05	3.95E-04	-1.83E-02
	Central/South America	-1.41E-02	-1.34E-02	1	-2.51E-04	-3.81E-06	1.07E-04	-2.84E-03

**Fig. S2o.** Correlation of the emissions in 1997 for biomass burning.

Source sector	Region	Agricultural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1	-8.19E-02	-1.81E-03	-4.30E-02	-2.15E-02	-3.47E-02	1.12E-02
	Southern Asia	-8.19E-02	1	2.61E-02	-2.41E-01	2.88E-02	-7.37E-02	2.02E-02
	Central/South America	-1.81E-03	2.61E-02	1	-2.56E-03	4.42E-03	1.23E-02	-1.07E-02
	Northern Asia	-4.30E-02	-2.41E-01	-2.56E-03	1	-1.81E-01	-4.90E-02	-1.81E-02
	Europe	-2.15E-02	2.88E-02	4.42E-03	-1.81E-01	1	-2.29E-02	3.54E-03
	North America	-3.47E-02	-7.37E-02	1.23E-02	-4.90E-02	-2.29E-02	1	3.19E-03
Industrial	Africa/Middle East	-5.52E-02	-1.31E-02	6.69E-04	-9.83E-03	-9.23E-03	-7.14E-03	1.41E-03
	Southern Asia	6.46E-03	-4.41E-01	-3.86E-04	-3.47E-02	1.53E-02	4.53E-03	-2.68E-03
	Central/South America	-3.02E-04	2.24E-03	-4.07E-03	-1.73E-04	3.84E-04	1.07E-03	-9.60E-04
	Northern Asia	2.45E-02	6.27E-03	-3.07E-03	-1.50E-01	-4.03E-02	9.66E-02	-1.24E-02
	Europe	-1.35E-02	-1.86E-03	2.31E-03	-5.04E-02	-7.17E-01	-1.87E-02	3.21E-04
	North America	7.13E-03	1.68E-02	4.14E-03	5.85E-02	2.98E-02	-2.37E-01	-6.45E-04
Natural Soil	Oceania	7.88E-04	1.34E-03	-5.67E-04	-1.36E-03	2.68E-04	1.69E-04	-2.03E-02
	Africa/Middle East	-1.77E-01	-1.15E-01	-7.21E-02	-1.77E-03	-1.72E-02	-1.63E-02	2.25E-02
	Southern Asia	-2.53E-02	-2.48E-01	9.52E-03	1.09E-02	1.30E-02	-2.20E-02	5.53E-02
	Central/South America	3.57E-02	8.58E-02	1.99E-01	7.60E-03	1.56E-02	4.97E-03	-8.64E-02
	Northern Asia	2.35E-02	4.48E-02	3.91E-03	-2.03E-01	2.17E-02	3.06E-02	-3.07E-02
	Europe	-1.90E-02	-8.19E-03	5.42E-03	5.65E-03	-2.46E-01	1.19E-02	9.30E-03
Ocean	North America	-4.21E-02	-8.76E-02	1.74E-02	5.51E-02	-1.26E-02	-4.65E-01	1.60E-02
	Oceania	5.28E-03	2.57E-02	-2.69E-02	-9.86E-03	7.71E-03	1.21E-02	-1.85E-01
	North Pacific	-1.99E-02	-1.56E-01	6.11E-03	-1.15E-03	3.57E-03	-5.51E-02	2.05E-02
	South Pacific	-2.00E-02	-1.79E-02	-2.90E-02	1.85E-02	1.50E-02	2.95E-02	3.83E-02
	Northern Ocean	-3.27E-04	-2.07E-03	-1.45E-03	-6.05E-02	-6.42E-02	-1.65E-03	4.51E-03
	Atlantic	-6.03E-02	-5.64E-02	-2.30E-02	-1.60E-02	-3.40E-02	-1.78E-01	2.07E-02
Biomass burning	Southern Ocean	2.43E-02	1.08E-01	-1.39E-01	-1.94E-02	8.49E-03	2.98E-02	-3.91E-02
	Indian Ocean	-2.65E-02	-6.93E-02	-5.69E-02	5.45E-03	1.86E-03	2.25E-02	-1.98E-02
	Africa/Middle East	-2.86E-02	-2.46E-02	-3.08E-02	7.24E-03	2.25E-03	3.73E-03	1.35E-02
	Southern Asia	-1.35E-02	-7.41E-02	5.28E-03	4.31E-03	6.82E-03	-1.13E-02	8.62E-03
	Central/South America	-8.04E-03	6.33E-03	-1.73E-02	1.48E-03	1.65E-03	3.62E-03	8.35E-03
	Northern Asia	3.78E-03	-3.39E-02	9.01E-03	1.88E-02	-8.24E-03	1.33E-02	5.60E-03
Fig. S2p.	Europe	-3.11E-05	6.75E-06	-3.00E-05	-6.85E-04	-2.88E-04	-1.14E-04	-9.82E-07
	North America	3.31E-04	-2.76E-03	2.03E-03	6.65E-03	-2.26E-03	7.40E-03	2.94E-03
	Oceania	1.70E-04	6.45E-03	-3.52E-03	-1.90E-03	5.44E-04	1.71E-03	-2.71E-03

Correlation of the emissions in 1998 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-5.52E-02	6.46E-03	-3.02E-04	2.45E-02	-1.35E-02	7.13E-03	7.88E-04
	Southern Asia	-1.31E-02	-4.41E-01	2.24E-03	6.27E-03	-1.86E-03	1.68E-02	1.34E-03
	Central/South America	6.69E-04	-3.86E-04	-4.07E-03	-3.07E-03	2.31E-03	4.14E-03	-5.67E-04
	Northern Asia	-9.83E-03	-3.47E-02	-1.73E-04	-1.50E-01	-5.04E-02	5.85E-02	-1.36E-03
	Europe	-9.23E-03	1.53E-02	3.84E-04	-4.03E-02	-7.17E-01	2.98E-02	2.68E-04
	North America	-7.14E-03	4.53E-03	1.07E-03	9.66E-02	-1.87E-02	-2.37E-01	1.69E-04
Industrial	Oceania	1.41E-03	-2.68E-03	-9.60E-04	-1.24E-02	3.21E-04	-6.45E-04	-2.03E-02
	Africa/Middle East	1	8.07E-04	3.98E-05	2.24E-03	-4.43E-03	1.40E-03	9.80E-05
	Southern Asia	8.07E-04	1	-3.94E-05	-3.92E-02	3.01E-03	1.22E-02	-2.04E-04
	Central/South America	3.98E-05	-3.94E-05	1	-1.92E-04	2.00E-04	3.93E-04	-5.07E-05
	Northern Asia	2.24E-03	-3.92E-02	-1.92E-04	1	-1.94E-02	-3.13E-01	-7.25E-04
	Europe	-4.43E-03	3.01E-03	2.00E-04	-1.94E-02	1	9.64E-03	2.09E-05
Natural Soil	North America	1.40E-03	1.22E-02	3.93E-04	-3.13E-01	9.64E-03	1	-8.64E-05
	Oceania	9.80E-05	-2.04E-04	-5.07E-05	-7.25E-04	2.09E-05	-8.64E-05	1
	Africa/Middle East	-3.09E-02	3.36E-02	-6.74E-03	8.19E-02	-7.20E-03	1.81E-02	1.70E-03
	Southern Asia	-2.84E-03	-9.85E-02	6.71E-04	-1.56E-03	-9.62E-03	5.09E-03	4.00E-03
	Central/South America	-8.21E-04	8.61E-03	-1.69E-02	1.49E-02	7.45E-03	2.18E-03	-5.44E-03
	Northern Asia	5.29E-03	-6.06E-03	3.22E-04	-6.75E-02	2.68E-02	2.79E-02	-2.32E-03
Ocean	Europe	-6.59E-03	8.57E-03	4.17E-04	2.69E-02	-2.01E-01	1.67E-02	6.36E-04
	North America	-5.27E-03	5.04E-02	1.43E-03	-1.74E-01	-5.98E-05	-2.56E-01	9.14E-04
	Oceania	1.15E-03	-5.08E-04	-2.56E-03	-1.72E-02	2.96E-03	3.24E-03	-1.23E-02
	North Pacific	-4.21E-03	-4.56E-02	3.86E-04	3.79E-02	-5.23E-03	1.93E-03	1.46E-03
	South Pacific	-1.03E-03	4.62E-04	-3.61E-03	8.61E-03	8.68E-03	9.40E-03	3.01E-03
	Northern Ocean	4.65E-04	-3.32E-03	-1.40E-04	3.69E-02	1.15E-02	3.73E-02	4.11E-04
Biomass burning	Atlantic	-9.56E-03	-7.32E-03	-2.30E-03	-2.08E-01	-1.13E-02	-1.85E-01	1.51E-03
	Southern Ocean	2.54E-03	-3.10E-02	-1.15E-02	2.67E-03	3.46E-04	1.44E-02	-2.72E-03
	Indian Ocean	-2.39E-03	4.02E-02	-5.62E-03	-1.05E-02	2.77E-03	3.45E-03	-1.62E-03
	Africa/Middle East	2.80E-03	4.02E-03	2.91E-03	1.62E-02	1.75E-03	7.08E-03	1.04E-03
	Southern Asia	-2.24E-03	-2.45E-02	3.83E-04	-1.81E-03	4.05E-03	5.37E-04	6.29E-04
	Central/South America	-8.84E-04	1.22E-03	-1.64E-03	3.28E-03	9.28E-04	2.57E-03	6.87E-04
	Northern Asia	1.33E-03	9.98E-03	7.36E-04	5.52E-02	-3.16E-03	1.07E-02	3.49E-04
	Europe	1.77E-05	-8.08E-05	-2.86E-06	-2.91E-04	-5.85E-05	2.79E-04	7.55E-08
	North America	4.59E-04	3.11E-03	1.63E-04	1.36E-02	1.72E-03	7.78E-03	2.04E-04
	Oceania	9.25E-05	2.01E-03	-3.36E-04	-2.53E-03	2.00E-04	6.78E-04	-1.84E-04

**Fig. S2p.** Correlation of the emissions in 1998 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.77E-01	-2.53E-02	-3.57E-02	2.35E-02	-1.90E-02	-4.21E-02	5.28E-03
	Southern Asia	-1.15E-01	-2.48E-01	8.58E-02	4.48E-02	-8.19E-03	-8.76E-02	2.57E-02
	Central/South America	-7.21E-02	9.52E-03	-1.99E-01	3.91E-03	5.42E-03	1.74E-02	-2.69E-02
	Northern Asia	-1.77E-03	1.09E-02	7.60E-03	-2.03E-01	5.65E-03	5.51E-02	-9.86E-03
	Europe	-1.72E-02	1.30E-02	1.56E-02	2.17E-02	-2.46E-01	-1.26E-02	7.71E-03
	North America	-1.63E-02	-2.20E-02	4.97E-03	3.06E-02	1.19E-02	-4.65E-01	1.21E-02
Industrial	Oceania	2.25E-02	5.53E-02	-8.64E-02	-3.07E-02	9.30E-03	1.60E-02	-1.85E-01
	Africa/Middle East	-3.09E-02	-2.84E-03	-8.21E-04	5.29E-03	-6.59E-03	-5.27E-03	1.15E-03
	Southern Asia	3.36E-02	-9.85E-02	8.61E-03	-6.06E-03	8.57E-03	5.04E-02	-5.08E-04
	Central/South America	-6.74E-03	6.71E-04	-1.69E-02	3.22E-04	4.17E-04	1.43E-03	-2.56E-03
	Northern Asia	8.19E-02	-1.56E-03	1.49E-02	-6.75E-02	2.69E-02	-1.74E-01	-1.72E-02
	Europe	-7.20E-03	-9.62E-03	7.45E-03	2.68E-02	-2.01E-01	-5.98E-05	2.96E-03
Natural Soil	North America	1.81E-02	5.09E-03	2.18E-03	2.79E-02	1.67E-02	-2.56E-01	3.24E-03
	Oceania	1.70E-03	4.00E-03	-5.44E-03	-2.32E-03	6.36E-04	9.14E-04	-1.23E-02
	Africa/Middle East	1	-1.55E-01	-3.67E-01	1.03E-01	-1.46E-02	-1.58E-01	-1.68E-02
	Southern Asia	-1.55E-01	1	-9.95E-02	-5.78E-01	1.08E-01	3.69E-02	4.48E-02
	Central/South America	-3.67E-01	-9.95E-02	1	-5.03E-02	-1.42E-02	-3.73E-02	-1.00E-01
	Northern Asia	1.03E-01	-5.78E-01	-5.03E-02	1	-1.83E-01	-1.49E-01	-4.58E-02
Ocean	Europe	-1.46E-02	1.08E-01	-1.42E-02	-1.83E-01	1	-1.04E-01	7.57E-03
	North America	-1.58E-01	3.69E-02	-3.73E-02	-1.49E-01	-1.04E-01	1	3.06E-02
	Oceania	-1.68E-02	4.48E-02	-1.00E-01	-4.58E-02	7.57E-03	3.06E-02	1
	North Pacific	7.00E-02	1.98E-01	2.27E-02	-2.28E-01	4.50E-02	5.58E-02	1.06E-02
	South Pacific	-1.22E-01	3.33E-03	-4.58E-01	-4.26E-03	8.71E-03	4.98E-02	-2.04E-02
	Northern Ocean	4.68E-02	9.63E-02	4.98E-02	-8.22E-02	-1.27E-02	-5.86E-03	1.33E-03
Biomass burning	Atlantic	-8.91E-02	5.30E-02	2.59E-02	2.19E-02	2.75E-02	1.10E-01	1.85E-03
	Southern Ocean	1.06E-01	2.11E-01	-7.48E-02	-8.48E-02	1.60E-02	4.54E-02	-2.68E-02
	Indian Ocean	-8.82E-02	-1.38E-01	-2.10E-01	6.20E-02	7.52E-03	4.15E-02	-6.29E-02
	Africa/Middle East	1.43E-01	-2.40E-02	1.64E-02	2.28E-02	4.10E-03	-8.71E-04	9.39E-03
	Southern Asia	1.64E-02	5.50E-02	-1.91E-02	-4.07E-02	-1.44E-02	1.40E-02	-4.67E-03
	Central/South America	-4.26E-02	-6.78E-03	1.46E-02	3.98E-03	-9.86E-04	4.54E-03	-5.86E-03
Biomass burning	Northern Asia	1.61E-02	2.06E-03	-4.80E-02	-2.11E-01	-4.58E-02	-1.70E-01	1.30E-02
	Europe	1.86E-04	7.92E-06	3.44E-04	7.46E-04	-3.27E-03	2.81E-04	-3.08E-05
	North America	5.02E-03	2.72E-02	-1.38E-02	-5.97E-02	-3.41E-02	-1.11E-01	2.98E-03
	Oceania	-3.22E-03	-8.53E-03	-5.29E-03	3.32E-03	8.77E-04	4.04E-03	-6.14E-03

**Fig. S2q.** Correlation of the emissions in 1998 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-1.99E-02	-2.00E-02	-3.27E-04	-6.03E-02	2.43E-02	-2.65E-02
	Southern Asia	-1.56E-01	-1.79E-02	-2.07E-03	-5.64E-02	1.08E-01	-6.93E-02
	Central/South America	6.11E-03	-2.90E-02	-1.45E-03	-2.30E-02	-1.39E-01	-5.69E-02
	Northern Asia	-1.15E-03	1.85E-02	-6.05E-02	-1.60E-02	-1.94E-02	5.45E-03
	Europe	3.57E-03	1.50E-02	-6.42E-02	-3.40E-02	8.49E-03	1.86E-03
	North America	-5.51E-02	2.95E-02	-1.65E-03	-1.78E-01	2.98E-02	2.25E-02
	Oceania	2.05E-02	3.83E-02	4.51E-03	2.07E-02	-3.91E-02	-1.98E-02
Industrial	Africa/Middle East	-4.21E-03	-1.03E-03	4.65E-04	-9.56E-03	2.54E-03	-2.39E-03
	Southern Asia	-4.56E-02	4.62E-04	-3.32E-03	-7.32E-03	-3.10E-02	4.02E-02
	Central/South America	3.86E-04	-3.61E-03	-1.40E-04	-2.30E-03	-1.15E-02	-5.62E-03
	Northern Asia	3.79E-02	8.61E-03	3.69E-02	-2.08E-01	2.67E-03	-1.05E-02
	Europe	-5.23E-03	8.68E-03	1.15E-02	-1.13E-02	3.46E-04	2.77E-03
	North America	1.93E-03	9.40E-03	3.73E-02	-1.85E-01	1.44E-02	3.45E-03
	Oceania	1.46E-03	3.01E-03	4.11E-04	1.51E-03	-2.72E-03	-1.62E-03
Natural Soil	Africa/Middle East	7.00E-02	-1.22E-01	4.68E-02	-8.91E-02	1.06E-01	-8.82E-02
	Southern Asia	1.98E-01	3.33E-03	9.63E-02	5.30E-02	2.11E-01	-1.38E-01
	Central/South America	2.27E-02	-4.58E-01	4.98E-02	2.59E-02	-7.48E-02	-2.10E-01
	Northern Asia	-2.28E-01	-4.26E-03	-8.22E-02	2.19E-02	-8.48E-02	6.20E-02
	Europe	4.50E-02	8.71E-03	-1.27E-02	2.75E-02	1.60E-02	7.52E-03
	North America	5.58E-02	4.98E-02	-5.86E-03	1.10E-01	4.54E-02	4.15E-02
	Oceania	1.06E-02	-2.04E-02	1.33E-03	1.85E-03	-2.68E-02	-6.29E-02
Ocean	North Pacific	1	-4.75E-02	-1.06E-01	-1.87E-01	3.88E-02	4.18E-02
	South Pacific	-4.75E-02	1	-1.03E-02	-8.60E-02	5.57E-02	-3.83E-02
	Northern Ocean	-1.06E-01	-1.03E-02	1	-2.84E-01	2.56E-02	2.18E-03
	Atlantic	-1.87E-01	-8.60E-02	-2.84E-01	1	-7.87E-02	-2.77E-02
	Southern Ocean	3.88E-02	5.57E-02	2.56E-02	-7.87E-02	1	-6.21E-01
	Indian Ocean	4.18E-02	-3.83E-02	2.18E-03	-2.77E-02	-6.21E-01	1
Biomass burning	Africa/Middle East	-2.02E-03	-7.37E-02	6.39E-05	-6.45E-02	-1.47E-02	-6.79E-02
	Southern Asia	-5.70E-02	-4.55E-02	-4.71E-03	-3.01E-02	2.16E-02	-4.39E-03
	Central/South America	-4.70E-03	-8.55E-02	-2.24E-03	-2.39E-02	-5.05E-02	-3.77E-02
	Northern Asia	-1.46E-01	3.48E-02	2.11E-02	6.11E-02	2.37E-04	2.75E-02
	Europe	-1.68E-03	-9.26E-05	-1.27E-03	-1.33E-03	5.47E-05	3.79E-05
	North America	1.04E-02	7.45E-03	-1.28E-02	1.54E-02	3.17E-03	2.90E-03
	Oceania	9.79E-04	-8.61E-03	-9.65E-04	-1.60E-03	-6.00E-03	-1.64E-02

**Fig. S2r.** Correlation of the emissions in 1998 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.86E-02	-1.35E-02	-8.04E-03	3.78E-03	-3.11E-05	3.31E-04	1.70E-04
	Southern Asia	-2.46E-02	-7.41E-02	6.33E-03	-3.39E-02	6.75E-06	-2.76E-03	6.45E-03
	Central/South America	-3.08E-02	5.28E-03	-1.73E-02	9.01E-03	-3.00E-05	2.03E-03	-3.52E-03
	Northern Asia	7.24E-03	4.31E-03	1.48E-03	1.88E-02	-6.85E-04	6.65E-03	-1.90E-03
	Europe	2.25E-03	6.82E-03	1.65E-03	-8.24E-03	-2.88E-04	-2.26E-03	5.44E-04
	North America	3.73E-03	-1.13E-02	3.62E-03	1.33E-02	-1.14E-04	7.40E-03	1.71E-03
Industrial	Oceania	1.35E-02	8.62E-03	8.35E-03	5.60E-03	-9.82E-07	2.94E-03	-2.71E-03
	Africa/Middle East	-2.80E-03	-2.24E-03	-8.84E-04	1.33E-03	1.77E-05	4.59E-04	9.25E-05
	Southern Asia	4.02E-03	-2.45E-02	1.22E-03	9.98E-03	-8.08E-05	3.11E-03	2.01E-03
	Central/South America	-2.91E-03	3.83E-04	-1.64E-03	7.36E-04	-2.86E-06	1.63E-04	-3.36E-04
	Northern Asia	1.62E-02	-1.81E-03	3.28E-03	5.52E-02	-2.91E-04	1.36E-02	-2.53E-03
	Europe	1.75E-03	4.05E-03	9.28E-04	-3.16E-03	-5.85E-05	1.72E-03	2.00E-04
Natural Soil	North America	7.08E-03	5.37E-04	2.57E-03	1.07E-02	2.79E-04	7.78E-03	6.78E-04
	Oceania	1.04E-03	6.29E-04	6.87E-04	3.49E-04	7.55E-08	2.04E-04	-1.84E-04
	Africa/Middle East	-1.43E-01	1.64E-02	-4.26E-02	1.61E-02	1.86E-04	5.02E-03	-3.22E-03
	Southern Asia	-2.40E-02	5.50E-02	-6.78E-03	2.06E-03	7.92E-06	2.72E-02	-8.53E-03
	Central/South America	-1.64E-02	-1.91E-02	1.46E-02	-4.80E-02	3.44E-04	-1.38E-02	-5.29E-03
	Northern Asia	2.28E-02	-4.07E-02	3.98E-03	-2.11E-01	7.46E-04	-5.97E-02	3.32E-03
Ocean	Europe	4.10E-03	-1.44E-02	-9.86E-04	-4.58E-02	-3.27E-03	-3.41E-02	8.77E-04
	North America	-8.71E-04	1.40E-02	4.54E-03	-1.70E-01	2.81E-04	-1.11E-01	4.04E-03
	Oceania	-9.39E-03	-4.67E-03	-5.86E-03	1.30E-02	-3.08E-05	2.98E-03	-6.14E-03
	North Pacific	-2.02E-03	-5.70E-02	-4.70E-03	-1.46E-01	-1.68E-03	1.04E-02	9.79E-04
	South Pacific	-7.37E-02	-4.55E-02	-8.55E-02	3.48E-02	-9.26E-05	7.45E-03	-8.61E-03
	Northern Ocean	6.39E-05	-4.71E-03	-2.24E-03	2.11E-02	-1.27E-03	-1.28E-02	-9.65E-04
Biomass burning	Atlantic	-6.45E-02	-3.01E-02	-2.39E-02	6.11E-02	-1.33E-03	1.54E-02	-1.60E-03
	Southern Ocean	-1.47E-02	2.16E-02	-5.05E-02	2.37E-04	5.47E-05	3.17E-03	-6.00E-03
	Indian Ocean	-6.79E-02	-4.39E-03	-3.77E-02	2.75E-02	3.79E-05	2.90E-03	-1.64E-02
	Africa/Middle East	1	-2.74E-03	2.73E-02	1.30E-02	-6.22E-05	3.25E-03	-3.46E-03
	Southern Asia	-2.74E-03	1	-3.17E-04	-1.42E-03	-6.79E-05	-1.13E-03	8.43E-04
	Central/South America	-2.73E-02	-3.17E-04	1	6.57E-03	-7.42E-06	5.47E-04	-3.27E-03
	Northern Asia	1.30E-02	-1.42E-03	6.57E-03	1	3.76E-04	-4.80E-02	2.40E-03
	Europe	-6.22E-05	-6.79E-05	-7.42E-06	3.76E-04	1	-6.84E-05	-4.41E-06
	North America	3.25E-03	-1.13E-03	5.47E-04	-4.80E-02	-6.84E-05	1	3.20E-04
	Oceania	-3.46E-03	8.43E-04	-3.27E-03	2.40E-03	-4.41E-06	3.20E-04	1

**Fig. S2s.** Correlation of the emissions in 1998 for biomass burning.

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -6.62E-02	-5.03E-03	-3.12E-02	-1.52E-02	-3.62E-02	4.62E-03	
	Southern Asia	-6.62E-02	1	2.78E-02	-2.01E-01	2.52E-02	-6.80E-02	1.76E-02
	Central/South America	-5.03E-03	2.78E-02	1	-2.28E-03	5.61E-03	1.19E-02	-1.65E-02
	Northern Asia	-3.12E-02	-2.01E-01	-2.28E-03	1	-1.82E-01	-4.89E-02	-1.46E-02
	Europe	-1.52E-02	2.52E-02	5.61E-03	-1.82E-01	1	-2.20E-02	3.65E-03
	North America	-3.62E-02	-6.80E-02	1.19E-02	-4.89E-02	-2.20E-02	1	4.38E-03
	Oceania	4.62E-03	1.76E-02	-1.65E-02	1.46E-02	3.65E-03	4.38E-03	1
Industrial	Africa/Middle East	-5.10E-02	-1.16E-02	3.31E-04	-7.43E-03	-7.64E-03	-7.75E-03	7.73E-04
	Southern Asia	8.17E-03	-3.68E-01	2.32E-03	-5.33E-02	1.89E-02	1.44E-03	-1.14E-03
	Central/South America	-5.44E-04	2.51E-03	-4.07E-03	-1.54E-04	5.10E-04	1.10E-03	-1.47E-03
	Northern Asia	1.53E-02	-2.26E-02	-6.95E-04	-1.17E-01	-3.86E-02	5.18E-02	-5.00E-03
	Europe	-1.93E-02	-6.30E-06	3.26E-03	-5.67E-02	-6.72E-01	-1.85E-02	1.34E-03
	North America	7.93E-03	2.20E-02	1.38E-03	4.06E-02	2.91E-02	-2.87E-01	8.31E-05
	Oceania	4.05E-04	1.33E-03	-1.12E-03	-1.26E-03	2.84E-04	2.41E-04	-7.03E-03
Natural Soil	Africa/Middle East	-1.66E-01	-3.89E-02	-7.45E-02	-9.94E-03	-7.61E-03	-9.81E-03	4.72E-04
	Southern Asia	-5.07E-02	-3.35E-01	9.37E-04	1.00E-02	6.17E-03	-1.05E-02	3.20E-02
	Central/South America	6.17E-02	2.98E-02	2.13E-01	2.34E-02	2.04E-02	1.99E-02	-5.02E-02
	Northern Asia	3.01E-02	2.27E-02	-4.93E-03	-2.15E-01	1.88E-02	2.07E-02	-2.37E-02
	Europe	-3.37E-02	-1.67E-02	6.59E-03	-3.16E-02	-2.48E-01	-6.75E-03	5.61E-03
	North America	-3.82E-02	-6.66E-02	1.34E-02	7.20E-02	-2.22E-02	-4.07E-01	1.39E-02
	Oceania	-9.23E-04	2.18E-02	-2.45E-02	-4.46E-03	5.74E-03	7.18E-03	-5.76E-02
Ocean	North Pacific	-1.73E-02	-1.72E-01	8.32E-03	1.46E-02	1.04E-02	-9.86E-02	1.14E-02
	South Pacific	1.43E-03	2.14E-02	-1.24E-02	8.23E-03	1.03E-02	2.46E-03	2.36E-02
	Northern Ocean	4.99E-03	-1.05E-02	1.82E-03	-5.55E-02	-9.48E-02	-2.23E-02	3.27E-03
	Atlantic	-7.25E-02	-7.71E-02	-1.46E-02	-5.13E-02	-6.09E-02	-1.98E-01	1.20E-02
	Southern Ocean	1.57E-02	1.05E-01	-1.59E-01	-2.42E-02	1.55E-02	4.18E-02	-5.79E-02
	Indian Ocean	-3.26E-02	-6.51E-02	-7.71E-02	1.67E-02	3.85E-03	2.62E-02	-5.36E-02
	Africa/Middle East	-2.58E-02	-1.90E-02	-1.88E-02	3.48E-03	2.54E-03	-1.42E-03	6.22E-03
Biomass burning	Southern Asia	-9.78E-03	-4.11E-02	2.38E-03	8.84E-03	2.77E-03	-1.15E-02	2.99E-03
	Central/South America	-3.80E-03	4.56E-03	-7.67E-03	-3.56E-04	9.48E-04	4.55E-03	2.50E-03
	Northern Asia	2.25E-04	-8.32E-03	8.16E-04	4.21E-03	1.38E-03	4.82E-03	1.28E-03
	Europe	-3.28E-04	-6.04E-05	3.36E-05	-1.48E-06	-4.27E-04	1.50E-04	2.38E-05
	North America	1.31E-03	-1.53E-03	3.77E-04	6.95E-03	-1.08E-03	-3.94E-03	6.84E-04
	Oceania	-9.68E-04	5.85E-03	-4.63E-03	-4.04E-04	7.13E-04	2.76E-03	-4.05E-03

**Fig. S2t.** Correlation of the emissions in 1999 for agricultural soil.

Source sector	Region	Industrial							
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania	
Agricultural Soil	Africa/Middle East	-5.10E-02	8.17E-03	-5.44E-04	1.53E-02	-1.93E-02	7.93E-03	4.05E-04	
	Southern Asia	-1.16E-02	-3.68E-01	2.51E-03	-2.26E-02	-6.30E-06	2.20E-02	1.33E-03	
	Central/South America	3.31E-04	2.32E-03	-4.07E-03	-6.95E-04	3.26E-03	1.38E-03	-1.12E-03	
	Northern Asia	-7.43E-03	-5.33E-02	-1.54E-04	-1.17E-01	-5.67E-02	4.06E-02	-1.26E-03	
	Europe	-7.64E-03	1.89E-02	5.10E-04	-3.86E-02	-6.72E-01	2.91E-02	2.84E-04	
	North America	-7.75E-03	1.44E-03	1.10E-03	5.18E-02	-1.85E-02	-2.87E-01	2.41E-04	
Industrial	Oceania	7.73E-04	-1.14E-03	-1.47E-03	-5.00E-03	1.34E-03	8.31E-05	-7.03E-03	
	Africa/Middle East	1	7.27E-04	1.77E-05	1.06E-03	-8.18E-03	1.37E-03	6.05E-05	
	Southern Asia	7.27E-04		1	2.29E-04	-4.54E-02	4.84E-03	1.07E-02	-1.09E-04
	Central/South America	1.77E-05	2.29E-04		1	-1.91E-05	2.98E-04	1.43E-04	-9.87E-05
	Northern Asia	1.06E-03	-4.54E-02	-1.91E-05		1	-2.94E-02	-2.38E-01	-3.73E-04
	Europe	-8.18E-03	4.84E-03	2.98E-04	-2.94E-02		1	1.01E-02	8.93E-05
Natural Soil	North America	1.37E-03	1.07E-02	1.43E-04	-2.38E-01	1.01E-02		1	-5.78E-06
	Oceania	6.05E-05	-1.09E-04	-9.87E-05	-3.73E-04	8.93E-05	-5.78E-06		1
	Africa/Middle East	-2.89E-02	5.04E-02	-6.96E-03	4.96E-02	-1.08E-02	1.58E-02	4.53E-04	
	Southern Asia	-6.21E-03	-1.36E-01	-8.84E-05	2.53E-02	-1.33E-02	3.05E-02	3.02E-03	
	Central/South America	-3.92E-03	1.17E-02	-1.88E-02	2.73E-02	1.43E-02	1.21E-02	-3.52E-03	
	Northern Asia	6.52E-03	-3.82E-02	-4.49E-04	-6.21E-02	2.02E-02	1.10E-03	-2.27E-03	
Ocean	Europe	-9.08E-03	1.26E-02	5.38E-04	2.16E-02	-1.22E-01	3.16E-02	4.93E-04	
	North America	-3.65E-03	6.85E-02	1.05E-03	-1.51E-01	7.24E-03	-2.02E-01	1.10E-03	
	Oceania	2.47E-04	-8.47E-04	-2.24E-03	-3.76E-03	3.08E-03	1.99E-03	-5.04E-03	
	North Pacific	-4.47E-03	-2.90E-02	6.85E-04	6.87E-02	-1.01E-02	-3.30E-02	1.03E-03	
	South Pacific	7.46E-04	7.90E-03	-2.19E-03	1.32E-02	6.60E-03	3.11E-03	2.11E-03	
	Northern Ocean	1.44E-03	-6.59E-03	1.70E-04	2.89E-02	-4.56E-03	2.68E-02	3.31E-04	
Biomass burning	Atlantic	-1.22E-02	-1.67E-02	-1.50E-03	-2.20E-01	-2.10E-02	-1.11E-01	1.08E-03	
	Southern Ocean	2.64E-03	-1.42E-02	-1.33E-02	-4.56E-03	5.68E-03	1.03E-02	-4.16E-03	
	Indian Ocean	-2.87E-03	2.92E-02	-7.46E-03	1.20E-02	5.30E-03	-3.54E-03	-4.73E-03	
	Africa/Middle East	2.90E-03	1.02E-02	1.83E-03	1.37E-02	1.36E-03	2.03E-03	6.17E-04	
	Southern Asia	-1.89E-03	-6.59E-03	1.85E-04	6.53E-03	1.85E-03	1.50E-03	2.53E-04	
	Central/South America	-2.34E-04	4.50E-03	-7.97E-04	3.26E-03	3.79E-04	1.89E-04	2.79E-04	

**Fig. S2u.** Correlation of the emissions in 1999 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.66E-01	-5.07E-02	-6.17E-02	3.01E-02	-3.37E-02	-3.82E-02	-9.23E-04
	Southern Asia	-3.89E-02	-3.35E-01	2.98E-02	2.27E-02	-1.67E-02	-6.66E-02	2.18E-02
	Central/South America	-7.45E-02	9.37E-04	-2.13E-01	-4.93E-03	6.59E-03	1.34E-02	-2.45E-02
	Northern Asia	-9.94E-03	1.00E-02	2.34E-02	-2.15E-01	-3.16E-02	7.20E-02	-4.46E-03
	Europe	-7.61E-03	6.17E-03	2.04E-02	1.88E-02	-2.48E-01	-2.22E-02	5.74E-03
	North America	-9.81E-03	-1.05E-02	1.99E-02	2.07E-02	-6.75E-03	-4.07E-01	7.18E-03
Industrial	Oceania	4.72E-04	3.20E-02	-5.02E-02	-2.37E-02	5.61E-03	1.39E-02	-5.76E-02
	Africa/Middle East	-2.89E-02	-6.21E-03	-3.92E-03	6.52E-03	-9.08E-03	-3.65E-03	2.47E-04
	Southern Asia	5.04E-02	-1.36E-01	1.17E-02	-3.82E-02	1.26E-02	6.85E-02	-8.47E-04
	Central/South America	-6.96E-03	-8.84E-05	-1.88E-02	-4.49E-04	5.38E-04	1.05E-03	-2.24E-03
	Northern Asia	4.96E-02	2.53E-02	2.73E-02	-6.21E-02	2.16E-02	-1.51E-01	-3.76E-03
	Europe	-1.08E-02	-1.33E-02	1.43E-02	2.02E-02	-1.22E-01	7.24E-03	3.08E-03
Natural Soil	North America	1.58E-02	3.05E-02	1.21E-02	1.10E-03	3.16E-02	-2.02E-01	1.99E-03
	Oceania	4.53E-04	3.02E-03	-3.52E-03	-2.27E-03	4.93E-04	1.10E-03	-5.04E-03
	Africa/Middle East	1	-2.60E-01	-3.32E-01	1.32E-01	-1.82E-02	-1.33E-01	-1.99E-02
	Southern Asia	-2.60E-01	1	-5.71E-02	-4.75E-01	7.53E-02	-4.35E-02	2.19E-02
	Central/South America	-3.32E-01	-5.71E-02	1	-9.32E-02	2.57E-03	-1.62E-02	-1.30E-01
	Northern Asia	1.32E-01	-4.75E-01	-9.32E-02	1	-1.67E-01	-2.49E-01	-4.20E-02
Ocean	Europe	-1.82E-02	7.53E-02	2.57E-03	-1.67E-01	1	-1.32E-01	2.70E-03
	North America	-1.33E-01	-4.35E-02	-1.62E-02	-2.49E-01	-1.32E-01	1	1.42E-02
	Oceania	-1.99E-02	2.19E-02	-1.30E-01	-4.20E-02	2.70E-03	1.42E-02	1
	North Pacific	5.30E-02	2.14E-01	4.06E-02	-3.08E-01	6.01E-02	9.47E-02	4.26E-03
	South Pacific	9.49E-03	-2.41E-02	-5.03E-01	7.85E-03	7.56E-03	1.13E-02	2.78E-02
	Northern Ocean	4.25E-02	1.17E-01	4.59E-02	-9.09E-02	-7.31E-04	-3.02E-03	2.12E-03
Biomass burning	Atlantic	-1.09E-01	7.42E-02	-4.65E-02	4.90E-02	2.33E-02	1.11E-01	9.98E-04
	Southern Ocean	2.47E-02	1.74E-01	-1.11E-02	-5.93E-02	1.47E-02	6.51E-02	-4.80E-02
	Indian Ocean	-1.50E-01	-1.37E-01	-1.88E-01	2.19E-02	1.02E-02	3.13E-02	-6.57E-02
	Africa/Middle East	1.32E-01	-3.72E-02	3.74E-02	2.85E-02	2.89E-03	-5.56E-03	5.68E-04
	Southern Asia	8.43E-03	3.29E-02	-1.69E-02	-3.53E-02	-9.50E-03	1.33E-03	-1.45E-03
	Central/South America	-3.68E-02	-1.97E-02	1.17E-02	1.54E-02	3.04E-03	1.29E-03	1.04E-03

**Fig. S2v.** Correlation of the emissions in 1999 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-1.73E-02	1.43E-03	4.99E-03	-7.25E-02	1.57E-02	-3.26E-02
	Southern Asia	-1.72E-01	2.14E-02	-1.05E-02	-7.71E-02	1.05E-01	-6.51E-02
	Central/South America	8.32E-03	-1.24E-02	1.82E-03	-1.46E-02	-1.59E-01	-7.71E-02
	Northern Asia	1.46E-02	8.23E-03	-5.55E-02	-5.13E-02	-2.42E-02	1.67E-02
	Europe	1.04E-02	1.03E-02	-9.48E-02	-6.09E-02	1.55E-02	3.85E-03
	North America	-9.86E-02	2.46E-03	-2.23E-02	-1.98E-01	4.18E-02	2.62E-02
	Oceania	1.14E-02	2.36E-02	3.27E-03	1.20E-02	-5.79E-02	-5.36E-02
Industrial	Africa/Middle East	-4.47E-03	7.46E-04	1.44E-03	-1.22E-02	2.64E-03	-2.87E-03
	Southern Asia	-2.90E-02	7.90E-03	-6.59E-03	-1.67E-02	-1.42E-02	2.92E-02
	Central/South America	6.85E-04	-2.19E-03	1.70E-04	-1.50E-03	-1.33E-02	-7.46E-03
	Northern Asia	6.87E-02	1.32E-02	2.89E-02	-2.20E-01	-4.56E-03	1.20E-02
	Europe	-1.01E-02	6.60E-03	-4.56E-03	-2.10E-02	5.68E-03	5.30E-03
	North America	-3.30E-02	3.11E-03	2.68E-02	-1.11E-01	1.03E-02	-3.54E-03
	Oceania	1.03E-03	2.11E-03	3.31E-04	1.08E-03	-4.16E-03	-4.73E-03
Natural Soil	Africa/Middle East	5.30E-02	9.49E-03	4.25E-02	-1.09E-01	2.47E-02	-1.50E-01
	Southern Asia	2.14E-01	-2.41E-02	1.17E-01	7.42E-02	1.74E-01	-1.37E-01
	Central/South America	4.06E-02	-5.03E-01	4.59E-02	-4.65E-02	-1.11E-02	-1.88E-01
	Northern Asia	-3.08E-01	7.85E-03	-9.09E-02	4.90E-02	-5.93E-02	2.19E-02
	Europe	6.01E-02	7.56E-03	-7.31E-04	2.33E-02	1.47E-02	1.02E-02
	North America	9.47E-02	1.13E-02	-3.02E-03	1.11E-01	6.51E-02	3.13E-02
	Oceania	4.26E-03	2.78E-02	2.12E-03	9.98E-04	-4.80E-02	-6.57E-02
Ocean	North Pacific	1	-3.49E-03	-7.19E-02	-2.16E-01	3.95E-02	3.28E-02
	South Pacific	-3.49E-03	1	3.00E-03	-2.95E-02	3.38E-03	3.09E-02
	Northern Ocean	-7.19E-02	3.00E-03	1	-2.76E-01	2.26E-02	3.42E-03
	Atlantic	-2.16E-01	-2.95E-02	-2.76E-01	1	-8.16E-02	-2.63E-02
	Southern Ocean	3.95E-02	3.38E-03	2.26E-02	-8.16E-02	1	-6.12E-01
	Indian Ocean	3.28E-02	3.09E-02	3.42E-03	-2.63E-02	-6.12E-01	1
Biomass burning	Africa/Middle East	-2.97E-03	-2.86E-02	1.85E-03	-5.54E-02	-1.96E-02	-4.52E-02
	Southern Asia	-3.43E-02	-3.62E-03	-6.39E-03	-3.40E-02	1.12E-02	-1.21E-03
	Central/South America	-6.07E-04	-2.70E-02	-1.08E-03	-1.57E-02	-5.88E-02	-2.25E-02
	Northern Asia	-5.34E-02	3.91E-03	-3.37E-03	1.04E-02	1.31E-03	4.62E-03
	Europe	8.06E-04	1.46E-04	4.36E-04	7.04E-04	3.94E-05	1.22E-04
	North America	-8.87E-03	1.87E-03	-7.41E-03	8.07E-03	1.54E-03	1.28E-03
	Oceania	3.70E-05	-5.74E-03	-8.00E-04	-4.23E-03	-1.29E-02	-1.67E-02

**Fig. S2w.** Correlation of the emissions in 1999 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.58E-02	-9.78E-03	-3.80E-03	2.25E-04	-3.28E-04	1.31E-03	-9.68E-04
	Southern Asia	-1.90E-02	-4.11E-02	4.56E-03	-8.32E-03	-6.04E-05	-1.53E-03	5.85E-03
	Central/South America	-1.88E-02	2.38E-03	-7.67E-03	8.16E-04	3.36E-05	3.77E-04	-4.63E-03
	Northern Asia	3.48E-03	8.84E-03	-3.56E-04	4.21E-03	-1.48E-06	6.95E-03	-4.04E-04
	Europe	2.54E-03	2.77E-03	9.48E-04	1.38E-03	-4.27E-04	-1.08E-03	7.13E-04
	North America	-1.42E-03	-1.15E-02	4.55E-03	4.82E-03	1.50E-04	-3.94E-03	2.76E-03
Industrial	Oceania	6.22E-03	2.99E-03	2.50E-03	1.28E-03	2.38E-05	6.84E-04	-4.05E-03
	Africa/Middle East	-2.90E-03	-1.89E-03	-2.34E-04	1.85E-04	-8.00E-05	4.48E-04	-4.78E-06
	Southern Asia	1.02E-02	-6.59E-03	4.50E-03	-4.08E-03	1.46E-04	3.05E-03	1.61E-03
	Central/South America	-1.83E-03	1.85E-04	-7.97E-04	5.88E-05	2.48E-06	2.56E-05	-4.67E-04
	Northern Asia	1.37E-02	6.53E-03	3.26E-03	8.87E-03	4.03E-04	1.21E-02	-1.85E-04
	Europe	1.36E-03	1.85E-03	3.79E-04	1.15E-03	1.06E-05	3.99E-04	3.79E-04
Natural Soil	North America	2.03E-03	1.50E-03	1.89E-04	8.63E-03	2.83E-04	1.18E-03	2.36E-04
	Oceania	6.17E-04	2.53E-04	2.79E-04	1.16E-04	2.11E-06	6.45E-05	-2.77E-04
	Africa/Middle East	-1.32E-01	8.43E-03	-3.68E-02	2.38E-03	-1.83E-04	4.37E-03	-1.23E-02
	Southern Asia	-3.72E-02	3.29E-02	-1.97E-02	1.78E-02	-7.87E-05	1.32E-02	-1.19E-02
	Central/South America	-3.74E-02	-1.69E-02	1.17E-02	-2.21E-03	-3.85E-06	-3.61E-03	2.09E-03
	Northern Asia	2.85E-02	-3.53E-02	1.54E-02	-8.17E-02	-1.18E-03	-3.60E-02	2.99E-03
Ocean	Europe	2.89E-03	-9.50E-03	3.04E-03	-1.24E-02	-3.30E-03	-8.63E-03	1.49E-03
	North America	-5.56E-03	1.33E-03	1.29E-03	-3.77E-02	-1.98E-03	-5.07E-02	2.95E-03
	Oceania	5.68E-04	-1.45E-03	1.04E-03	-2.16E-05	2.84E-05	-1.33E-04	-6.93E-03
	North Pacific	-2.97E-03	-3.43E-02	-6.07E-04	-5.34E-02	8.06E-04	-8.87E-03	3.70E-05
	South Pacific	-2.86E-02	-3.62E-03	-2.70E-02	3.91E-03	1.46E-04	1.87E-03	-5.74E-03
	Northern Ocean	1.85E-03	-6.39E-03	-1.08E-03	-3.37E-03	4.36E-04	-7.41E-03	-8.00E-04
Biomass burning	Atlantic	-5.54E-02	-3.40E-02	-1.57E-02	1.04E-02	7.04E-04	8.07E-03	-4.23E-03
	Southern Ocean	-1.96E-02	1.12E-02	-5.88E-02	1.31E-03	3.94E-05	1.54E-03	-1.29E-02
	Indian Ocean	-4.52E-02	-1.21E-03	-2.25E-02	4.62E-03	1.22E-04	1.28E-03	-1.67E-02
	Africa/Middle East	1	-3.14E-03	1.85E-02	1.65E-03	8.69E-05	1.63E-03	-5.31E-03
	Southern Asia	-3.14E-03	1	9.92E-04	-1.99E-03	9.13E-05	-3.41E-04	5.20E-04
	Central/South America	-1.85E-02	9.92E-04	1	7.76E-04	4.52E-05	8.27E-04	-4.57E-03

**Fig. S2x.** Correlation of the emissions in 1999 for biomass burning.

Source sector	Region	Agricultural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1	-7.12E-02	-2.19E-03	-3.60E-02	-1.53E-02	-4.27E-02	7.14E-03
	Southern Asia	-7.12E-02	1	2.59E-02	-2.29E-01	2.41E-02	-9.89E-02	2.32E-02
	Central/South America	-2.19E-03	2.59E-02	1	-3.67E-03	4.97E-03	1.20E-02	-1.85E-02
	Northern Asia	-3.60E-02	-2.29E-01	-3.67E-03	1	-1.79E-01	-5.25E-02	-1.55E-02
	Europe	-1.53E-02	2.41E-02	4.97E-03	-1.79E-01	1	-3.76E-02	3.15E-03
	North America	-4.27E-02	-9.89E-02	1.20E-02	-5.25E-02	-3.76E-02	1	6.98E-03
	Oceania	7.14E-03	2.32E-02	-1.85E-02	-1.55E-02	3.15E-03	6.98E-03	1
Industrial	Africa/Middle East	-6.67E-02	-9.16E-03	1.30E-03	-1.11E-02	-7.04E-03	-7.83E-03	1.24E-03
	Southern Asia	1.23E-02	-4.09E-01	1.72E-03	-6.06E-02	2.00E-02	8.00E-03	-6.01E-04
	Central/South America	-2.72E-04	2.37E-03	-4.38E-03	-3.15E-04	4.42E-04	1.09E-03	-1.75E-03
	Northern Asia	8.81E-03	-2.29E-02	-3.49E-03	-1.41E-01	-2.86E-02	6.68E-02	-5.20E-03
	Europe	-2.06E-02	-3.26E-03	2.54E-03	-4.51E-02	-6.26E-01	-2.14E-02	8.61E-04
	North America	6.09E-03	1.27E-02	1.37E-03	3.93E-02	2.37E-02	-2.95E-01	-8.37E-04
	Oceania	5.33E-04	1.71E-03	-1.32E-03	-1.09E-03	2.29E-04	4.66E-04	-6.92E-03
Natural Soil	Africa/Middle East	-1.97E-01	-7.97E-02	-6.96E-02	-1.49E-02	-1.38E-02	-4.33E-02	3.00E-03
	Southern Asia	-3.65E-02	-2.92E-01	1.63E-03	1.87E-02	6.44E-03	-2.03E-02	2.16E-02
	Central/South America	5.06E-02	5.81E-02	2.02E-01	1.17E-02	2.49E-02	2.11E-02	-4.93E-02
	Northern Asia	2.10E-02	-1.14E-02	2.28E-03	-2.01E-01	1.64E-02	2.14E-02	-1.55E-02
	Europe	-2.71E-02	4.56E-03	5.97E-03	-7.53E-03	-3.27E-01	-4.37E-03	4.24E-03
	North America	-2.49E-02	-2.27E-02	1.27E-02	8.37E-02	-1.40E-02	-4.14E-01	1.10E-02
	Oceania	5.09E-03	2.51E-02	-2.41E-02	-9.53E-03	5.03E-03	1.07E-02	-7.86E-02
Ocean	North Pacific	-7.38E-03	-1.23E-01	1.04E-02	2.56E-02	4.58E-03	-7.06E-02	1.19E-02
	South Pacific	-9.45E-03	6.36E-03	-1.98E-02	1.25E-02	1.61E-02	5.77E-03	1.51E-02
	Northern Ocean	6.07E-03	2.30E-03	1.32E-03	-5.88E-02	-7.41E-02	-1.38E-02	3.12E-03
	Atlantic	-6.84E-02	-1.09E-01	-1.24E-02	-4.04E-02	-6.04E-02	-1.73E-01	1.74E-02
	Southern Ocean	3.46E-02	1.35E-01	-1.47E-01	-2.49E-02	1.11E-02	4.23E-02	-7.17E-02
	Indian Ocean	-3.41E-02	-9.65E-02	-7.33E-02	2.16E-02	1.13E-03	2.42E-02	-2.98E-02
Biomass burning	Africa/Middle East	-2.36E-02	-2.57E-02	-2.18E-02	6.94E-03	3.13E-03	-2.24E-03	5.54E-03
	Southern Asia	-2.13E-03	-1.21E-02	1.57E-03	2.89E-03	1.75E-03	-1.06E-03	1.44E-03
	Central/South America	-1.76E-03	6.40E-04	-5.03E-03	6.19E-04	8.43E-04	2.05E-03	9.02E-04
	Northern Asia	-4.30E-04	-1.28E-02	3.26E-03	2.56E-02	6.91E-03	1.59E-03	2.69E-03
	Europe	-4.20E-04	-5.16E-05	3.27E-05	9.74E-04	3.34E-04	4.20E-04	1.24E-05
	North America	6.63E-04	1.73E-03	4.64E-04	-3.19E-04	1.05E-03	-2.00E-02	3.81E-04
	Oceania	-1.13E-03	2.52E-03	-4.46E-03	-7.31E-04	5.59E-04	2.43E-03	-1.59E-03

**Fig. S2y.** Correlation of the emissions in 2000 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-6.67E-02	1.23E-02	-2.72E-04	8.81E-03	-2.06E-02	6.09E-03	5.33E-04
	Southern Asia	-9.16E-03	-4.09E-01	2.37E-03	-2.29E-02	-3.26E-03	1.27E-02	1.71E-03
	Central/South America	1.30E-03	1.72E-03	-4.38E-03	-3.49E-03	2.54E-03	1.37E-03	-1.32E-03
	Northern Asia	-1.11E-02	-6.06E-02	-3.15E-04	-1.41E-01	-4.51E-02	3.93E-02	-1.09E-03
	Europe	-7.04E-03	2.00E-02	4.42E-04	-2.86E-02	-6.26E-01	2.37E-02	2.29E-04
	North America	-7.83E-03	8.00E-03	1.09E-03	6.68E-02	-2.14E-02	-2.95E-01	4.66E-04
Industrial	Oceania	1.24E-03	-6.01E-04	-1.75E-03	-5.20E-03	8.61E-04	-8.37E-04	-6.92E-03
	Africa/Middle East	1	1.86E-03	1.12E-04	-4.55E-03	-9.71E-03	2.15E-03	8.94E-05
	Southern Asia	1.86E-03	1	1.90E-04	-5.58E-02	3.33E-03	1.28E-02	-4.78E-05
	Central/South America	1.12E-04	1.90E-04	1	-2.68E-04	2.21E-04	1.32E-04	-1.24E-04
	Northern Asia	-4.55E-03	-5.58E-02	-2.68E-04	1	-3.51E-02	-2.78E-01	-3.79E-04
	Europe	-9.71E-03	3.33E-03	2.21E-04	-3.51E-02	1	9.33E-03	5.31E-05
Natural Soil	North America	2.15E-03	1.28E-02	1.32E-04	-2.78E-01	9.33E-03	1	-7.01E-05
	Oceania	8.94E-05	-4.78E-05	-1.24E-04	-3.79E-04	5.31E-05	-7.01E-05	1
	Africa/Middle East	-3.73E-02	4.63E-02	-6.63E-03	5.04E-02	-1.21E-02	1.13E-02	3.10E-04
	Southern Asia	-3.14E-03	-1.30E-01	-6.35E-05	2.36E-02	-4.83E-03	9.95E-03	1.82E-03
	Central/South America	5.38E-04	1.59E-03	-1.80E-02	2.31E-02	1.12E-02	3.87E-03	-3.66E-03
	Northern Asia	5.77E-03	-1.42E-02	2.36E-04	-3.75E-02	2.51E-02	4.46E-02	-1.39E-03
Ocean	Europe	-8.92E-03	1.05E-02	5.12E-04	3.27E-02	-2.20E-01	2.03E-02	3.42E-04
	North America	8.23E-03	6.27E-02	9.81E-04	-2.05E-01	1.51E-02	-2.11E-01	8.82E-04
	Oceania	1.34E-03	-8.08E-04	-2.28E-03	-8.09E-03	1.95E-03	3.38E-04	-6.12E-03
	North Pacific	-3.53E-03	-3.12E-02	9.57E-04	3.77E-02	-1.46E-02	-3.89E-02	9.23E-04
	South Pacific	2.76E-04	1.01E-02	-2.79E-03	1.06E-02	7.66E-03	1.60E-04	1.75E-03
	Northern Ocean	1.20E-03	-7.39E-03	1.47E-04	2.37E-02	2.10E-02	1.83E-02	2.49E-04
Biomass burning	Atlantic	-9.81E-03	-1.43E-02	-1.20E-03	-1.58E-01	-1.02E-02	-7.89E-02	1.26E-03
	Southern Ocean	4.39E-03	-2.00E-02	-1.17E-02	-1.91E-02	9.49E-04	6.68E-03	-5.12E-03
	Indian Ocean	-2.12E-03	2.66E-02	-7.20E-03	9.47E-03	3.61E-03	-2.45E-03	-2.63E-03
	Africa/Middle East	2.03E-03	5.77E-03	2.07E-03	8.87E-03	1.93E-03	1.21E-03	4.26E-04
	Southern Asia	-3.87E-04	-3.62E-03	1.43E-04	2.21E-03	7.02E-04	9.66E-05	1.08E-04
	Central/South America	-6.24E-06	9.10E-04	-4.77E-04	2.99E-04	4.57E-04	3.73E-04	7.72E-05

**Fig. S2z.** Correlation of the emissions in 2000 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.97E-01	-3.65E-02	-5.06E-02	2.10E-02	-2.71E-02	-2.49E-02	5.09E-03
	Southern Asia	-7.97E-02	-2.92E-01	5.81E-02	-1.14E-02	4.56E-03	-2.27E-02	2.51E-02
	Central/South America	-6.96E-02	1.63E-03	-2.02E-01	2.28E-03	5.97E-03	1.27E-02	-2.41E-02
	Northern Asia	-1.49E-02	1.87E-02	1.17E-02	-2.01E-01	-7.53E-03	8.37E-02	-9.53E-03
	Europe	-1.38E-02	6.44E-03	2.45E-02	1.64E-02	-3.27E-01	-1.40E-02	5.03E-03
	North America	-4.33E-02	-2.03E-02	2.11E-02	2.14E-02	-4.37E-03	-4.14E-01	1.07E-02
Industrial	Oceania	3.00E-03	2.16E-02	-4.93E-02	-1.55E-02	4.24E-03	1.10E-02	-7.86E-02
	Africa/Middle East	-3.73E-02	-3.14E-03	5.38E-04	5.77E-03	-8.92E-03	8.23E-05	1.34E-03
	Southern Asia	4.63E-02	-1.30E-01	1.59E-03	-1.42E-02	1.05E-02	6.27E-02	-8.08E-04
	Central/South America	-6.63E-03	-6.35E-05	-1.80E-02	2.36E-04	5.12E-04	9.81E-04	-2.28E-03
	Northern Asia	5.04E-02	2.36E-02	2.31E-02	-3.75E-02	3.27E-02	-2.05E-01	-8.09E-03
	Europe	-1.21E-02	-4.83E-03	1.12E-02	2.51E-02	-2.20E-01	1.51E-02	1.95E-03
Natural Soil	North America	1.13E-02	9.95E-03	3.87E-03	4.46E-02	2.03E-02	-2.11E-01	3.38E-04
	Oceania	3.10E-04	1.82E-03	-3.66E-03	-1.39E-03	3.42E-04	8.82E-04	-6.12E-03
	Africa/Middle East	1	-1.90E-01	-3.62E-01	8.28E-02	-1.65E-02	-1.07E-01	-1.21E-02
	Southern Asia	-1.90E-01	1	-5.41E-02	-4.20E-01	4.53E-02	-2.61E-03	1.49E-02
	Central/South America	-3.62E-01	-5.41E-02	1	-1.01E-01	-1.06E-02	-2.37E-02	-1.23E-01
	Northern Asia	8.28E-02	-4.20E-01	-1.01E-01	1	-1.44E-01	-2.85E-01	-2.42E-02
Ocean	Europe	-1.65E-02	4.53E-02	-1.06E-02	-1.44E-01	1	-1.08E-01	3.91E-03
	North America	-1.07E-01	-2.61E-03	-2.37E-02	-2.85E-01	-1.08E-01	1	1.52E-02
	Oceania	-1.21E-02	1.49E-02	-1.23E-01	-2.42E-02	3.91E-03	1.52E-02	1
	North Pacific	8.67E-02	1.37E-01	6.66E-03	-2.81E-01	4.24E-02	8.02E-02	1.04E-02
	South Pacific	-4.44E-02	-1.60E-02	-5.05E-01	7.81E-03	1.01E-02	3.95E-02	2.92E-02
	Northern Ocean	5.64E-02	9.11E-02	4.61E-02	-7.13E-02	1.66E-02	-8.53E-04	3.84E-03
Biomass burning	Atlantic	-7.98E-02	8.16E-02	-4.77E-02	3.41E-02	3.92E-02	9.79E-02	1.24E-02
	Southern Ocean	1.00E-01	1.62E-01	-7.49E-02	-5.09E-02	1.16E-02	5.50E-02	-3.47E-02
	Indian Ocean	-1.55E-01	-9.91E-02	-2.19E-01	3.10E-02	8.93E-03	1.94E-02	-3.40E-02
	Africa/Middle East	-1.04E-01	-7.49E-03	5.90E-02	9.18E-03	1.07E-03	3.10E-03	-4.00E-04
	Southern Asia	4.36E-03	6.08E-03	-8.64E-03	-1.65E-02	-3.55E-03	-3.79E-03	7.06E-04
	Central/South America	-1.31E-02	-1.08E-03	-9.74E-04	2.27E-03	1.06E-03	2.49E-03	-1.75E-04

**Fig. S2aa.** Correlation of the emissions in 2000 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-7.38E-03	-9.45E-03	6.07E-03	-6.84E-02	3.46E-02	-3.41E-02
	Southern Asia	-1.23E-01	6.36E-03	2.30E-03	-1.09E-01	1.35E-01	-9.65E-02
	Central/South America	1.04E-02	-1.98E-02	1.32E-03	-1.24E-02	-1.47E-01	-7.33E-02
	Northern Asia	2.56E-02	1.25E-02	-5.88E-02	-4.04E-02	-2.49E-02	2.16E-02
	Europe	4.58E-03	1.61E-02	-7.41E-02	-6.04E-02	1.11E-02	1.13E-03
	North America	-7.06E-02	5.77E-03	-1.38E-02	-1.73E-01	4.23E-02	2.42E-02
Industrial	Oceania	1.19E-02	1.51E-02	3.12E-03	1.74E-02	-7.17E-02	-2.98E-02
	Africa/Middle East	-3.53E-03	2.76E-04	1.20E-03	-9.81E-03	4.39E-03	-2.12E-03
	Southern Asia	-3.12E-02	1.01E-02	-7.39E-03	-1.43E-02	-2.00E-02	2.66E-02
	Central/South America	9.57E-04	-2.79E-03	1.47E-04	-1.20E-03	-1.17E-02	-7.20E-03
	Northern Asia	3.77E-02	1.06E-02	2.37E-02	-1.58E-01	-1.91E-02	9.47E-03
	Europe	-1.46E-02	7.66E-03	2.10E-02	-1.02E-02	9.49E-04	3.61E-03
Natural Soil	North America	-3.89E-02	1.60E-04	1.83E-02	-7.89E-02	6.68E-03	-2.45E-03
	Oceania	9.23E-04	1.75E-03	2.49E-04	1.26E-03	-5.12E-03	-2.63E-03
	Africa/Middle East	8.67E-02	-4.44E-02	5.64E-02	-7.98E-02	1.00E-01	-1.55E-01
	Southern Asia	1.37E-01	-1.60E-02	9.11E-02	8.16E-02	1.62E-01	-9.91E-02
	Central/South America	6.66E-03	-5.05E-01	4.61E-02	-4.77E-02	-7.49E-02	-2.19E-01
	Northern Asia	-2.81E-01	7.81E-03	-7.13E-02	3.41E-02	-5.09E-02	3.10E-02
Ocean	Europe	4.24E-02	1.01E-02	1.66E-02	3.92E-02	1.16E-02	8.93E-03
	North America	8.02E-02	3.95E-02	-8.53E-04	9.79E-02	5.50E-02	1.94E-02
	Oceania	1.04E-02	2.92E-02	3.84E-03	1.24E-02	-3.47E-02	-3.40E-02
	North Pacific	1	1.07E-02	-7.68E-02	-2.00E-01	1.90E-02	4.55E-02
	South Pacific	1.07E-02	1	2.05E-02	-4.47E-02	3.58E-02	1.47E-02
	Northern Ocean	-7.68E-02	2.05E-02	1	-3.11E-01	9.33E-03	1.24E-02
Biomass burning	Atlantic	-2.00E-01	-4.47E-02	-3.11E-01	1	-7.18E-02	-2.24E-02
	Southern Ocean	1.90E-02	3.58E-02	9.33E-03	-7.18E-02	1	-6.26E-01
	Indian Ocean	4.55E-02	1.47E-02	1.24E-02	-2.24E-02	-6.26E-01	1
	Africa/Middle East	1.29E-03	-4.73E-02	2.61E-03	-5.71E-02	4.74E-03	-4.66E-02
	Southern Asia	-1.43E-02	-2.99E-03	-9.87E-04	-5.33E-03	3.74E-03	1.77E-03
	Central/South America	3.76E-04	-1.68E-02	-5.59E-04	-7.87E-03	-1.44E-02	-9.69E-03

**Fig. S2ab.** Correlation of the emissions in 2000 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.36E-02	-2.13E-03	-1.76E-03	-4.30E-04	-4.20E-04	6.63E-04	-1.13E-03
	Southern Asia	-2.57E-02	-1.21E-02	6.40E-04	-1.28E-02	-5.16E-05	1.73E-03	2.52E-03
	Central/South America	-2.18E-02	1.57E-03	-5.03E-03	3.26E-03	3.27E-05	4.64E-04	-4.46E-03
	Northern Asia	6.94E-03	2.89E-03	6.19E-04	2.56E-02	9.74E-04	-3.19E-04	-7.31E-04
	Europe	3.13E-03	1.75E-03	8.43E-04	6.91E-03	3.34E-04	1.05E-03	5.59E-04
	North America	-2.24E-03	-1.06E-03	2.05E-03	1.59E-03	4.20E-04	-2.00E-02	2.43E-03
Industrial	Oceania	5.54E-03	1.44E-03	9.02E-04	2.69E-03	1.24E-05	3.81E-04	-1.59E-03
	Africa/Middle East	-2.03E-03	-3.87E-04	-6.24E-06	2.49E-04	-5.99E-05	7.93E-05	6.12E-05
	Southern Asia	5.77E-03	-3.62E-03	9.10E-04	-6.34E-03	1.60E-05	-1.33E-05	8.22E-04
	Central/South America	-2.07E-03	1.43E-04	-4.77E-04	2.71E-04	2.12E-06	3.52E-02	-4.25E-04
	Northern Asia	8.87E-03	2.21E-03	2.99E-04	3.36E-02	5.16E-04	1.83E-02	-6.08E-04
	Europe	1.93E-03	7.02E-04	4.57E-04	1.01E-03	-1.38E-03	2.91E-04	2.67E-04
Natural Soil	North America	1.21E-03	9.66E-05	3.73E-04	8.49E-03	3.01E-04	-3.02E-02	3.61E-04
	Oceania	4.26E-04	1.08E-04	7.72E-05	1.87E-04	7.13E-07	2.80E-05	-1.21E-04
	Africa/Middle East	-1.04E-01	4.36E-03	-1.31E-02	2.83E-03	-7.44E-04	2.17E-03	-1.07E-02
	Southern Asia	-7.49E-03	6.08E-03	-1.08E-03	7.80E-02	-6.99E-04	6.21E-05	-5.85E-03
	Central/South America	-5.90E-02	-8.64E-03	-9.74E-04	-1.00E-04	5.57E-05	-6.79E-03	-3.14E-04
	Northern Asia	9.18E-03	-1.65E-02	2.27E-03	-2.54E-01	1.14E-04	-5.21E-03	2.47E-03
Ocean	Europe	1.07E-03	-3.55E-03	1.06E-03	-1.33E-02	-6.16E-03	-1.85E-03	1.50E-03
	North America	3.10E-03	-3.79E-03	2.49E-03	-5.93E-02	-1.83E-03	-9.91E-03	3.13E-03
	Oceania	-4.00E-04	7.06E-04	-1.75E-04	3.36E-03	1.31E-05	7.71E-05	-4.64E-03
	North Pacific	1.29E-03	-1.43E-02	3.76E-04	-2.96E-02	7.42E-04	-1.48E-02	1.18E-03
	South Pacific	-4.73E-02	-2.99E-03	-1.68E-02	1.05E-02	1.72E-04	-3.64E-04	-8.09E-03
	Northern Ocean	2.61E-03	-9.87E-04	-5.59E-04	-1.04E-02	1.18E-04	1.51E-03	-4.69E-04
Biomass burning	Atlantic	-5.71E-02	-5.33E-03	-7.87E-03	1.08E-02	-9.17E-05	9.55E-03	-4.55E-03
	Southern Ocean	4.74E-03	3.74E-03	-1.44E-02	1.03E-02	1.32E-04	4.51E-04	8.23E-03
	Indian Ocean	-4.66E-02	1.77E-03	-9.69E-03	8.29E-03	1.15E-04	1.34E-03	-1.45E-02
	Africa/Middle East	1	-5.41E-04	7.15E-03	2.62E-03	-3.51E-05	7.82E-04	-4.76E-03
	Southern Asia	-5.41E-04	1	1.48E-04	-3.52E-03	-3.15E-05	-4.81E-04	2.79E-04
	Central/South America	-7.15E-03	1.48E-04	1	4.02E-04	2.89E-06	1.55E-04	-1.76E-03
	Northern Asia	2.62E-03	-3.52E-03	4.02E-04	1	-2.51E-04	-3.62E-03	7.43E-04
	Europe	-3.51E-05	-3.15E-05	2.89E-06	-2.51E-04	1	-1.35E-05	1.02E-05
	North America	7.82E-04	-4.81E-04	1.55E-04	-3.62E-03	-1.35E-05	1	1.57E-04
	Oceania	-4.76E-03	2.79E-04	-1.76E-03	7.43E-04	1.02E-05	1.57E-04	1

**Fig. S2ac.** Correlation of the emissions in 2000 for biomass burning.

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -4.87E-02	-5.23E-03	-4.11E-02	-1.32E-02	-2.64E-02	6.99E-03	
	Southern Asia	-4.87E-02	1	2.91E-02	-2.00E-01	3.30E-02	-4.99E-02	1.45E-02
	Central/South America	-5.23E-03	2.91E-02	1	-1.24E-03	4.60E-03	9.56E-03	-1.80E-02
	Northern Asia	-4.11E-02	-2.00E-01	-1.24E-03	1	-1.71E-01	-4.08E-02	-1.75E-02
	Europe	-1.32E-02	3.30E-02	4.60E-03	-1.71E-01	1	-1.14E-02	2.26E-03
	North America	-2.64E-02	-4.99E-02	9.56E-03	-4.08E-02	-1.14E-02	1	3.00E-03
	Oceania	6.99E-03	1.45E-02	-1.80E-02	-1.75E-02	2.26E-03	3.00E-03	1
Industrial	Africa/Middle East	-6.51E-02	-7.78E-03	3.62E-04	-1.04E-02	-6.58E-03	-5.73E-03	9.35E-04
	Southern Asia	1.74E-02	-3.72E-01	4.52E-03	-5.54E-02	2.08E-02	6.80E-03	-2.79E-03
	Central/South America	-6.20E-04	2.43E-03	-4.59E-03	-3.40E-05	4.19E-04	7.86E-04	-1.46E-03
	Northern Asia	1.31E-02	-3.14E-02	-9.54E-04	-1.29E-01	-3.50E-02	7.57E-02	-5.84E-03
	Europe	-7.24E-03	3.93E-03	1.52E-03	-2.92E-02	-7.04E-01	-1.02E-02	-1.42E-04
	North America	8.51E-03	1.88E-02	1.81E-03	4.35E-02	2.43E-02	-3.28E-01	-9.23E-04
	Oceania	4.99E-04	1.03E-03	-1.17E-03	-1.28E-03	1.65E-04	1.77E-04	-6.52E-03
Natural Soil	Africa/Middle East	-1.58E-01	-3.39E-03	-6.81E-02	8.62E-03	-4.32E-03	1.28E-03	2.22E-03
	Southern Asia	-8.46E-02	-4.07E-01	-1.59E-02	-4.69E-02	-1.39E-02	-4.37E-02	3.53E-02
	Central/South America	2.31E-02	6.65E-02	1.89E-01	2.03E-03	2.17E-02	2.12E-02	-8.07E-02
	Northern Asia	2.64E-02	-4.10E-02	1.16E-02	-1.710E-01	3.27E-02	6.89E-02	-6.87E-03
	Europe	-2.26E-02	-4.94E-03	4.15E-03	-1.87E-02	-2.69E-01	1.74E-02	4.23E-03
	North America	-3.29E-02	-1.09E-02	1.38E-02	4.17E-02	-2.34E-02	-4.39E-01	1.22E-02
	Oceania	3.65E-03	2.02E-02	-2.14E-02	-1.19E-02	4.39E-03	6.58E-03	-6.07E-02
Ocean	North Pacific	-4.62E-03	-1.63E-01	8.02E-03	-2.42E-02	6.51E-03	-5.39E-02	8.08E-03
	South Pacific	-3.43E-02	2.75E-03	-3.51E-02	1.86E-02	1.46E-02	2.04E-03	1.01E-02
	Northern Ocean	7.38E-04	-2.84E-02	1.22E-03	-6.97E-02	-8.33E-02	-1.23E-04	2.78E-03
	Atlantic	-8.37E-02	-1.15E-01	-2.12E-02	-5.35E-02	-4.99E-02	-1.80E-01	1.64E-02
	Southern Ocean	2.10E-02	7.49E-02	-1.53E-01	-2.59E-02	6.19E-03	2.45E-02	-5.27E-02
	Indian Ocean	-2.91E-02	-4.98E-02	-7.96E-02	1.90E-02	1.62E-03	2.00E-02	-2.66E-02
Biomass burning	Africa/Middle East	-2.19E-02	-2.35E-03	-2.60E-02	8.63E-03	2.32E-03	3.73E-03	3.03E-03
	Southern Asia	-7.75E-04	-1.77E-02	-4.88E-04	-7.61E-03	2.02E-03	-1.12E-03	9.99E-04
	Central/South America	-1.69E-03	1.92E-03	-4.62E-03	3.57E-04	4.67E-04	7.83E-04	-4.52E-04
	Northern Asia	3.11E-03	-4.37E-03	3.09E-04	-2.45E-03	2.18E-03	1.43E-02	5.36E-04
	Europe	-8.51E-04	1.62E-04	-2.85E-05	2.67E-04	8.98E-04	4.18E-04	2.89E-05
	North America	-6.58E-05	-2.60E-04	1.23E-04	8.45E-04	1.12E-04	-6.92E-04	1.91E-04
	Oceania	-9.79E-04	7.84E-03	-9.02E-03	-8.44E-04	1.10E-03	3.25E-03	-5.59E-03

**Fig. S2ad.** Correlation of the emissions in 2001 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-6.51E-02	1.74E-02	-6.20E-04	1.31E-02	-7.24E-03	8.51E-03	4.99E-04
	Southern Asia	-7.78E-03	-3.72E-01	2.43E-03	-3.14E-02	3.93E-03	1.88E-02	1.03E-03
	Central/South America	3.62E-04	4.52E-03	-4.59E-03	-9.54E-04	1.52E-03	1.81E-03	-1.17E-03
	Northern Asia	-1.04E-02	-5.54E-02	-3.40E-05	-1.29E-01	-2.92E-02	4.35E-02	-1.28E-03
	Europe	-6.58E-03	2.08E-02	4.19E-04	-3.50E-02	-7.04E-01	2.43E-02	1.65E-04
	North America	-5.73E-03	6.80E-03	7.86E-04	7.57E-02	-1.02E-02	-3.28E-01	1.77E-04
Industrial	Oceania	9.35E-04	-2.79E-03	-1.46E-03	-5.84E-03	-1.42E-04	-9.23E-04	-6.52E-03
	Africa/Middle East	1	2.24E-03	1.07E-05	2.37E-05	-2.41E-03	1.66E-03	6.52E-05
	Southern Asia	2.24E-03	1	4.31E-04	-5.16E-02	2.67E-03	1.47E-02	-1.84E-04
	Central/South America	1.07E-05	4.31E-04	1	4.76E-06	1.32E-04	1.80E-04	-9.56E-05
	Northern Asia	2.37E-05	-5.16E-02	4.76E-06	1	-1.77E-02	-2.77E-01	-3.93E-04
	Europe	-2.41E-03	2.67E-03	1.32E-04	-1.77E-02	1	4.85E-03	-9.44E-06
Natural Soil	North America	1.66E-03	1.47E-02	1.80E-04	-2.77E-01	4.85E-03	1	-6.85E-05
	Oceania	6.52E-05	-1.84E-04	-9.56E-05	-3.93E-04	-9.44E-06	-6.85E-05	1
	Africa/Middle East	-2.65E-02	5.16E-02	-6.26E-03	4.24E-02	-4.59E-04	1.40E-02	2.55E-04
	Southern Asia	-9.57E-03	-1.34E-01	-1.68E-03	2.16E-02	-1.74E-02	9.76E-03	2.59E-03
	Central/South America	1.48E-03	5.39E-03	-1.60E-02	1.43E-02	7.55E-03	2.92E-03	-5.40E-03
	Northern Asia	6.30E-03	-2.94E-02	9.09E-04	-1.67E-02	3.47E-02	4.36E-02	-6.50E-04
Ocean	Europe	-8.36E-03	7.63E-03	3.07E-04	2.20E-02	-1.83E-01	2.07E-02	3.20E-04
	North America	-2.02E-03	6.86E-02	9.67E-04	-1.72E-01	1.21E-02	-1.82E-01	8.11E-04
	Oceania	7.92E-04	-9.97E-04	-1.85E-03	-6.29E-03	8.18E-04	-2.47E-04	-4.67E-03
	North Pacific	-1.82E-03	-5.34E-02	5.74E-04	2.40E-02	-1.32E-02	-2.27E-02	5.85E-04
	South Pacific	-2.77E-03	2.40E-02	-4.44E-03	1.67E-02	6.44E-03	9.83E-04	1.25E-03
	Northern Ocean	-4.93E-04	-1.27E-02	9.82E-05	1.42E-02	1.93E-02	2.01E-02	2.53E-04
Biomass burning	Atlantic	-1.39E-02	-2.10E-02	-2.19E-03	-1.66E-01	-1.45E-02	-9.08E-02	1.17E-03
	Southern Ocean	2.28E-03	-2.58E-02	-1.20E-02	-1.23E-02	-7.27E-04	7.20E-03	-3.76E-03
	Indian Ocean	-2.30E-03	2.56E-02	-7.38E-03	9.67E-04	2.41E-03	-2.79E-03	-2.54E-03
	Africa/Middle East	1.96E-03	1.35E-02	-2.40E-03	7.78E-03	1.81E-03	2.31E-03	2.36E-04
	Southern Asia	-5.24E-05	-3.57E-03	-5.57E-05	-2.15E-03	3.21E-04	7.65E-04	7.75E-05
	Central/South America	-1.34E-04	1.11E-03	-4.23E-04	4.57E-04	2.06E-04	2.70E-04	-2.63E-05

**Fig. S2ae.** Correlation of the emissions in 2001 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.58E-01	-8.46E-02	-2.31E-02	2.64E-02	-2.26E-02	-3.29E-02	3.65E-03
	Southern Asia	-3.39E-03	-4.07E-01	6.65E-02	-4.10E-02	-4.94E-03	-1.09E-02	2.02E-02
	Central/South America	-6.81E-02	-1.59E-02	-1.89E-01	1.16E-02	4.15E-03	1.38E-02	-2.14E-02
	Northern Asia	8.62E-03	-4.69E-02	2.03E-03	-1.70E-01	-1.87E-02	4.17E-02	-1.19E-02
	Europe	-4.32E-03	-1.39E-02	2.17E-02	3.27E-02	-2.69E-01	-2.34E-02	4.39E-03
	North America	1.28E-03	-4.37E-02	2.12E-02	6.89E-02	1.74E-02	-4.39E-01	6.58E-03
Industrial	Oceania	2.22E-03	3.53E-02	-8.07E-02	-6.87E-03	4.23E-03	1.22E-02	-6.07E-02
	Africa/Middle East	-2.65E-02	-9.57E-03	1.48E-03	6.30E-03	-8.36E-03	-2.02E-03	7.92E-04
	Southern Asia	5.16E-02	-1.34E-01	5.39E-03	-2.94E-02	7.63E-03	6.86E-02	-9.97E-04
	Central/South America	-6.26E-03	-1.68E-03	-1.60E-02	9.09E-04	3.07E-04	9.67E-04	-1.85E-03
	Northern Asia	4.24E-02	2.16E-02	1.43E-02	-1.67E-02	2.20E-02	-1.72E-01	-6.29E-03
	Europe	-4.59E-04	-1.74E-02	7.55E-03	3.47E-02	-1.83E-01	1.21E-02	8.18E-04
Natural Soil	North America	1.40E-02	9.76E-03	2.92E-03	4.36E-02	2.07E-02	-1.82E-01	-2.47E-04
	Oceania	2.55E-04	2.59E-03	-5.40E-03	-6.50E-04	3.20E-04	8.11E-04	-4.67E-03
	Africa/Middle East	1	-2.79E-01	-3.37E-01	6.95E-02	-1.57E-02	-8.76E-02	-1.21E-02
	Southern Asia	-2.79E-01	1	-9.00E-02	-1.96E-01	4.48E-02	-1.21E-01	1.04E-02
	Central/South America	-3.37E-01	-9.00E-02	1	-9.13E-02	-4.38E-03	-2.66E-02	-1.08E-01
	Northern Asia	6.95E-02	-1.96E-01	-9.13E-02	1	-1.88E-01	-3.23E-01	-1.69E-02
Ocean	Europe	-1.57E-02	4.48E-02	-4.38E-03	-1.88E-01	1	-1.29E-01	3.34E-03
	North America	-8.76E-02	-1.21E-01	-2.66E-02	-3.23E-01	-1.29E-01	1	1.86E-02
	Oceania	-1.21E-02	1.04E-02	-1.08E-01	-1.69E-02	3.34E-03	1.86E-02	1
	North Pacific	4.41E-02	1.51E-01	1.13E-02	-2.18E-01	4.05E-02	8.35E-02	4.47E-03
	South Pacific	-8.45E-02	-1.22E-01	-4.14E-01	4.90E-04	3.22E-03	5.22E-02	-2.02E-02
	Northern Ocean	2.62E-02	1.33E-01	4.07E-02	-9.56E-02	2.68E-03	-1.00E-02	1.32E-03
Biomass burning	Atlantic	-1.30E-01	1.27E-01	2.33E-03	1.72E-02	1.56E-02	8.56E-02	4.42E-03
	Southern Ocean	6.64E-02	2.30E-01	-1.41E-01	-2.03E-02	8.78E-03	4.21E-02	-3.19E-02
	Indian Ocean	-1.21E-01	-1.15E-01	-2.12E-01	4.18E-02	8.70E-03	4.89E-02	-4.00E-02
	Africa/Middle East	8.49E-02	-5.11E-02	2.31E-04	2.60E-02	3.52E-03	1.10E-02	-3.75E-03
	Southern Asia	-1.24E-03	3.62E-03	-3.45E-03	-5.59E-04	-7.58E-05	2.73E-03	-3.02E-04
	Central/South America	-6.80E-03	-3.81E-03	7.51E-04	2.17E-03	2.84E-04	2.34E-03	-1.62E-03
Fig. S2af.	Northern Asia	5.82E-03	-3.18E-03	-1.97E-03	-9.24E-02	-1.77E-02	-6.06E-02	1.17E-03
	Europe	-6.00E-04	1.92E-04	-5.39E-05	4.50E-04	-1.43E-02	-8.22E-04	-1.47E-06
	North America	2.90E-05	1.90E-03	-5.91E-04	-7.41E-03	-1.75E-03	-9.93E-03	1.31E-04
	Oceania	-9.03E-03	-7.73E-03	-1.89E-03	3.27E-03	1.20E-03	7.74E-03	-1.02E-02

**Fig. S2af.** Correlation of the emissions in 2001 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-4.62E-03	-3.43E-02	7.38E-04	-8.37E-02	2.10E-02	-2.91E-02
	Southern Asia	-1.63E-01	2.75E-03	-2.84E-02	-1.15E-01	7.49E-02	-4.98E-02
	Central/South America	8.02E-03	-3.51E-02	1.22E-03	-2.12E-02	-1.53E-01	-7.96E-02
	Northern Asia	-2.42E-02	1.86E-02	-6.97E-02	-5.35E-02	-2.59E-02	1.90E-02
	Europe	6.51E-03	1.46E-02	-8.33E-02	-4.99E-02	6.19E-03	1.62E-03
	North America	-5.39E-02	2.04E-03	-1.23E-04	-1.80E-01	2.45E-02	2.00E-02
Industrial	Oceania	8.08E-03	1.01E-02	2.78E-03	1.64E-02	-5.27E-02	-2.66E-02
	Africa/Middle East	-1.82E-03	-2.77E-03	-4.93E-04	-1.39E-02	2.28E-03	-2.30E-03
	Southern Asia	-5.34E-02	2.40E-02	-1.27E-02	-2.10E-02	-2.58E-02	2.56E-02
	Central/South America	5.74E-04	-4.44E-03	9.82E-05	-2.19E-03	-1.20E-02	-7.38E-03
	Northern Asia	2.40E-02	1.67E-02	1.42E-02	-1.66E-01	-1.23E-02	9.67E-04
	Europe	-1.32E-02	6.44E-03	1.93E-02	-1.45E-02	-7.27E-04	2.41E-03
Natural Soil	North America	-2.27E-02	9.83E-04	2.01E-02	-9.08E-02	7.20E-03	-2.79E-03
	Oceania	5.85E-04	1.25E-03	2.53E-04	1.17E-03	-3.76E-03	-2.54E-03
	Africa/Middle East	4.41E-02	-8.45E-02	2.62E-02	-1.30E-01	6.64E-02	-1.21E-01
	Southern Asia	1.51E-01	-1.22E-01	1.33E-01	1.27E-01	2.30E-01	-1.15E-01
	Central/South America	1.13E-02	-4.14E-01	4.07E-02	2.33E-03	-1.41E-01	-2.12E-01
	Northern Asia	-2.18E-01	4.90E-04	-9.56E-02	1.72E-02	-2.03E-02	4.18E-02
Ocean	Europe	4.05E-02	3.22E-03	2.68E-03	1.56E-02	8.78E-03	8.70E-03
	North America	8.35E-02	5.22E-02	-1.00E-02	8.56E-02	4.21E-02	4.89E-02
	Oceania	4.47E-03	-2.02E-02	1.32E-03	4.42E-03	-3.19E-02	-4.00E-02
	North Pacific	1	-2.05E-02	-7.78E-02	-2.02E-01	2.63E-02	4.38E-02
	South Pacific	-2.05E-02	1	-3.74E-03	-9.92E-02	-1.52E-02	-3.41E-02
	Northern Ocean	-7.78E-02	-3.74E-03	1	-2.80E-01	2.05E-02	4.46E-03
Biomass burning	Atlantic	-2.02E-01	-9.92E-02	-2.80E-01	1	-5.25E-02	-2.35E-02
	Southern Ocean	2.63E-02	-1.52E-02	2.05E-02	-5.25E-02	1	-5.48E-01
	Indian Ocean	4.38E-02	-3.41E-02	4.46E-03	-2.35E-02	-5.48E-01	1
	Africa/Middle East	7.81E-03	-7.10E-02	-9.23E-04	-5.13E-02	3.30E-02	-5.85E-02
	Southern Asia	-2.29E-03	-9.18E-03	-4.43E-04	-5.24E-03	3.84E-03	-3.99E-03
	Central/South America	3.32E-04	-1.51E-02	-2.65E-04	-6.08E-03	-1.95E-02	-9.78E-03

**Fig. S2ag.** Correlation of the emissions in 2001 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.19E-02	-7.75E-04	-1.69E-03	3.11E-03	-8.51E-04	-6.58E-05	-9.79E-04
	Southern Asia	-2.35E-03	-1.77E-02	1.92E-03	-4.37E-03	1.62E-04	-2.60E-04	7.84E-03
	Central/South America	-2.60E-02	-4.88E-04	-4.62E-03	3.09E-04	-2.85E-05	1.23E-04	-9.02E-03
	Northern Asia	8.63E-03	-7.61E-03	3.57E-04	-2.45E-03	2.67E-04	8.45E-04	-8.44E-04
	Europe	2.32E-03	2.02E-03	4.67E-04	2.18E-03	8.98E-04	1.12E-04	1.10E-03
	North America	3.73E-03	-1.12E-03	7.83E-04	1.43E-02	4.18E-04	-6.92E-04	3.25E-03
Industrial	Oceania	3.03E-03	9.99E-04	-4.52E-04	5.36E-04	2.89E-05	1.91E-04	-5.59E-03
	Africa/Middle East	-1.96E-03	-5.24E-05	-1.34E-04	5.60E-04	-2.38E-04	1.32E-05	4.64E-05
	Southern Asia	1.35E-02	-3.57E-03	1.11E-03	-6.67E-03	6.21E-05	3.07E-04	1.55E-03
	Central/South America	-2.40E-03	-5.57E-05	-4.23E-04	2.84E-05	-3.10E-06	8.02E-06	-8.10E-04
	Northern Asia	7.78E-03	-2.15E-03	4.57E-04	1.11E-02	-3.41E-05	7.25E-04	-1.62E-03
	Europe	1.81E-03	3.21E-04	2.06E-04	1.52E-03	6.67E-04	4.44E-04	4.17E-04
Natural Soil	North America	2.31E-03	7.65E-04	2.70E-04	7.51E-03	1.54E-04	3.62E-05	2.20E-04
	Oceania	2.36E-04	7.75E-05	-2.63E-05	4.93E-05	2.70E-06	1.46E-05	-4.15E-04
	Africa/Middle East	-8.49E-02	-1.24E-03	-6.80E-03	5.82E-03	-6.00E-04	2.90E-05	-9.03E-03
	Southern Asia	-5.11E-02	3.62E-03	-3.81E-03	-3.18E-03	1.92E-04	1.90E-03	-7.73E-03
	Central/South America	2.31E-04	-3.45E-03	7.51E-04	-1.97E-03	-5.39E-05	-5.91E-04	-1.89E-03
	Northern Asia	2.60E-02	-5.59E-04	2.17E-03	-9.24E-02	4.50E-04	-7.41E-03	3.27E-03
Ocean	Europe	3.52E-03	-7.58E-05	2.84E-04	-1.77E-02	-1.43E-02	-1.75E-03	1.20E-03
	North America	1.10E-02	2.73E-03	2.34E-03	-6.06E-02	-8.22E-04	-9.93E-03	7.74E-03
	Oceania	-3.75E-03	-3.02E-04	-1.62E-03	1.17E-03	-1.47E-06	1.31E-04	-1.02E-02
	North Pacific	7.81E-03	-2.29E-03	3.32E-04	-5.36E-02	1.03E-03	-5.17E-05	1.23E-03
	South Pacific	-7.10E-02	-9.18E-03	-1.51E-02	6.17E-03	-1.46E-05	-2.33E-04	-1.50E-02
	Northern Ocean	-9.23E-04	-4.43E-04	-2.65E-04	-9.89E-03	8.61E-04	-1.94E-03	-1.30E-03
Biomass burning	Atlantic	-5.13E-02	-5.24E-03	-6.08E-03	1.03E-02	7.48E-04	-1.45E-04	-4.92E-03
	Southern Ocean	-3.30E-02	3.84E-03	-1.95E-02	-2.01E-03	9.62E-05	5.30E-04	-1.00E-02
	Indian Ocean	-5.85E-02	-3.99E-03	-9.78E-03	5.64E-03	6.56E-06	3.04E-04	-1.45E-02
	Africa/Middle East	1	-1.31E-03	5.72E-03	2.84E-03	-5.47E-05	1.66E-04	-8.07E-03
	Southern Asia	-1.31E-03	1	-2.36E-04	-1.79E-03	1.63E-05	-8.63E-06	-4.08E-04
	Central/South America	-5.72E-03	-2.36E-04	1	1.98E-04	-2.81E-06	1.14E-05	-1.84E-03
	Northern Asia	2.84E-03	-1.79E-03	1.98E-04	1	-7.98E-04	-1.07E-03	2.70E-04
	Europe	-5.47E-05	1.63E-05	-2.81E-06	-7.98E-04	1	-2.81E-05	-1.38E-05
	North America	1.66E-04	-8.63E-06	1.14E-05	-1.07E-03	-2.81E-05	1	4.29E-05
	Oceania	-8.07E-03	-4.08E-04	-1.84E-03	2.70E-04	-1.38E-05	4.29E-05	1

**Fig. S2ah.** Correlation of the emissions in 2001 for biomass burning.

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -7.41E-02	-7.05E-03	-3.54E-02	-2.05E-02	-1.28E-02	6.39E-03	
	Southern Asia	-7.41E-02	1	2.36E-02	-2.01E-01	1.98E-02	-5.42E-02	1.33E-02
	Central/South America	-7.05E-03	2.36E-02	1	-8.38E-04	5.41E-03	6.89E-03	-1.34E-02
	Northern Asia	-3.54E-02	-2.01E-01	-8.38E-04	1	-1.60E-01	-4.38E-02	-1.69E-02
	Europe	-2.05E-02	1.98E-02	5.41E-03	-1.60E-01	1	-9.40E-03	1.82E-03
	North America	-1.28E-02	-5.42E-02	6.89E-03	-4.38E-02	-9.40E-03	1	3.93E-04
Industrial	Africa/Middle East	-5.98E-02	-1.16E-02	5.74E-04	-8.97E-03	-7.23E-03	-3.45E-03	8.67E-04
	Southern Asia	1.08E-02	-3.55E-01	1.75E-03	-4.08E-02	1.29E-02	6.93E-04	-7.55E-04
	Central/South America	-7.91E-04	1.97E-03	-5.15E-03	3.05E-05	4.99E-04	6.60E-04	-1.08E-03
	Northern Asia	2.21E-02	-2.21E-02	3.45E-03	-1.08E-01	-4.58E-02	1.85E-01	-6.23E-03
	Europe	-1.25E-02	3.09E-03	1.58E-03	-3.49E-02	-6.99E-01	-1.19E-02	5.15E-04
	North America	8.69E-03	1.37E-02	2.03E-03	2.37E-02	2.05E-02	-3.63E-01	-1.14E-03
Natural Soil	Oceania	4.79E-04	8.74E-04	-8.71E-04	-1.19E-03	1.08E-04	-4.52E-06	-5.26E-03
	Africa/Middle East	-1.87E-01	-5.15E-02	-6.86E-02	6.24E-03	-1.08E-02	1.94E-02	6.36E-03
	Southern Asia	-7.12E-02	-4.33E-01	-4.95E-03	-7.06E-02	-1.48E-02	-1.21E-02	2.24E-02
	Central/South America	5.83E-02	8.43E-02	3.08E-01	4.40E-03	2.76E-02	3.41E-02	7.85E-02
	Northern Asia	2.81E-02	3.52E-02	1.00E-02	-1.51E-01	3.26E-02	7.04E-02	-1.21E-02
	Europe	-2.76E-02	-7.97E-03	8.10E-03	-4.09E-02	-2.89E-01	2.17E-02	4.18E-03
Ocean	North America	-2.91E-02	-2.38E-02	1.85E-02	6.14E-02	-1.19E-02	-4.98E-01	8.78E-03
	Oceania	4.95E-03	1.20E-02	-1.43E-02	-1.37E-02	4.13E-03	1.62E-03	-5.50E-02
	North Pacific	1.70E-03	9.53E-03	8.74E-04	2.90E-03	2.69E-03	5.30E-03	-6.94E-04
	South Pacific	-1.23E-03	-9.43E-03	5.53E-04	1.29E-03	1.05E-03	-1.85E-03	1.50E-03
	Northern Ocean	7.37E-05	-2.46E-03	7.41E-04	1.13E-03	2.92E-03	2.05E-04	-1.19E-03
	Atlantic	7.03E-04	-1.12E-02	2.73E-03	-1.61E-03	1.14E-03	-4.59E-03	-4.98E-03
Biomass burning	Southern Ocean	4.31E-03	2.78E-02	5.52E-03	2.34E-03	5.73E-04	1.10E-02	-7.78E-04
	Indian Ocean	3.03E-04	-5.27E-03	-5.01E-05	-1.67E-04	7.68E-04	-1.16E-03	-2.50E-03
	Africa/Middle East	-2.70E-02	-1.77E-02	-3.53E-02	1.23E-02	5.36E-03	7.24E-03	5.75E-03
	Southern Asia	-6.07E-03	-3.16E-02	-3.39E-03	4.31E-03	2.59E-03	-2.07E-03	1.90E-03
	Central/South America	-5.15E-03	7.11E-03	-1.56E-02	2.41E-03	1.92E-03	4.38E-03	2.06E-03
	Northern Asia	7.92E-03	-1.18E-02	6.29E-03	1.59E-02	-7.03E-03	2.63E-02	1.24E-03
Fig. S2ai.	Europe	-2.46E-05	1.57E-04	5.54E-05	-3.52E-04	9.44E-05	3.44E-04	5.55E-05
	North America	4.65E-03	1.62E-02	2.87E-03	1.82E-02	1.21E-03	2.21E-02	1.05E-03
	Oceania	-7.53E-04	6.23E-03	-7.36E-03	-2.05E-03	1.56E-03	1.94E-03	-1.46E-03

**Fig. S2ai.** Correlation of the emissions in 2002 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-5.98E-02	1.08E-02	-7.91E-04	2.21E-02	-1.25E-02	8.69E-03	4.79E-04
	Southern Asia	-1.16E-02	-3.55E-01	1.97E-03	-2.21E-02	3.09E-03	1.37E-02	8.74E-04
	Central/South America	5.74E-04	1.75E-03	-5.15E-03	3.45E-03	1.58E-03	2.03E-03	8.71E-04
	Northern Asia	-8.97E-03	-4.08E-02	3.05E-05	-1.08E-01	-3.49E-02	2.37E-02	-1.19E-03
	Europe	-7.23E-03	1.29E-02	4.99E-04	-4.58E-02	-6.99E-01	2.05E-02	1.08E-04
	North America	-3.45E-03	6.93E-04	6.60E-04	1.85E-01	-1.19E-02	-3.63E-01	-4.52E-06
Industrial	Oceania	8.67E-04	-7.55E-04	-1.08E-03	-6.23E-03	5.15E-04	-1.14E-03	-5.26E-03
	Africa/Middle East	1	1.64E-03	3.36E-05	1.55E-03	-5.17E-03	1.43E-03	6.12E-05
	Southern Asia	1.64E-03	1	2.10E-04	-2.48E-02	2.99E-03	6.14E-03	-7.36E-05
	Central/South America	3.36E-05	2.10E-04	1	4.53E-04	1.56E-04	2.16E-04	-6.95E-05
	Northern Asia	1.55E-03	-2.48E-02	4.53E-04	1	-2.34E-02	-2.13E-01	-4.47E-04
	Europe	-5.17E-03	2.99E-03	1.56E-04	-2.34E-02	1	6.03E-03	2.79E-05
Natural Soil	North America	1.43E-03	6.14E-03	2.16E-04	-2.13E-01	6.03E-03	1	-8.23E-05
	Oceania	6.12E-05	-7.36E-05	-6.95E-05	-4.47E-04	2.79E-05	-8.23E-05	1
	Africa/Middle East	-3.00E-02	2.50E-02	-6.41E-03	6.50E-02	-1.83E-03	1.92E-02	5.29E-04
	Southern Asia	-9.28E-03	-9.23E-02	-9.29E-04	3.71E-02	-5.02E-03	1.62E-02	1.89E-03
	Central/South America	4.75E-04	1.49E-02	-2.64E-02	4.51E-02	1.75E-02	1.56E-02	-5.34E-03
	Northern Asia	5.22E-03	5.28E-03	9.99E-04	-6.95E-02	1.71E-02	1.42E-02	-1.08E-03
Ocean	Europe	-9.74E-03	5.03E-03	6.71E-04	1.00E-02	-1.69E-01	2.02E-02	3.18E-04
	North America	-2.56E-03	2.42E-02	1.41E-03	-2.45E-01	1.77E-02	-1.78E-01	5.79E-04
	Oceania	8.92E-04	3.54E-04	-1.21E-03	-4.85E-03	1.89E-03	-5.91E-04	-4.22E-03
	North Pacific	3.97E-04	8.27E-04	8.19E-05	4.94E-04	3.35E-03	1.81E-03	-5.53E-05
	South Pacific	-2.86E-04	-6.05E-04	2.65E-05	2.15E-03	1.53E-04	-2.14E-04	1.09E-04
	Northern Ocean	-5.90E-05	-1.93E-04	7.45E-05	1.27E-03	2.34E-03	4.81E-04	-9.27E-05
Biomass burning	Atlantic	-2.23E-04	-1.69E-03	2.80E-04	1.69E-03	-3.11E-04	-2.98E-04	-3.73E-04
	Southern Ocean	1.11E-03	3.18E-03	4.83E-04	-2.98E-03	2.61E-03	1.44E-03	-4.19E-05
	Indian Ocean	-5.51E-05	-8.97E-04	1.47E-05	4.55E-04	5.98E-04	1.15E-04	-1.86E-04
	Africa/Middle East	1.95E-03	4.07E-03	3.39E-03	1.64E-02	2.11E-03	3.76E-03	4.80E-04
	Southern Asia	-7.48E-04	-6.29E-04	-3.49E-04	4.60E-03	1.15E-03	-9.99E-05	1.84E-04
	Central/South America	-1.82E-04	1.78E-03	-1.48E-03	4.19E-03	2.70E-04	1.37E-03	2.08E-04

**Fig. S2aj.** Correlation of the emissions in 2002 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.87E-01	-7.12E-02	-5.83E-02	2.81E-02	-2.76E-02	-2.91E-02	4.95E-03
	Southern Asia	-5.15E-02	-4.33E-01	8.43E-02	3.52E-02	-7.97E-03	-2.38E-02	1.20E-02
	Central/South America	-6.86E-02	-4.95E-03	-3.08E-01	1.00E-02	8.10E-03	1.85E-02	-1.43E-02
	Northern Asia	6.24E-03	-7.06E-02	4.40E-03	-1.51E-01	-4.09E-02	6.14E-02	-1.37E-02
	Europe	-1.08E-02	-1.48E-02	2.76E-02	3.26E-02	-2.89E-01	-1.19E-02	4.13E-03
	North America	1.94E-02	-1.21E-02	3.41E-02	7.04E-02	2.17E-02	-4.98E-01	1.62E-02
Industrial	Oceania	6.36E-03	2.24E-02	-7.85E-02	-1.21E-02	4.18E-03	8.78E-03	-5.50E-02
	Africa/Middle East	-3.00E-02	-9.28E-03	4.75E-04	5.22E-03	-9.74E-03	-2.56E-03	8.92E-04
	Southern Asia	2.50E-02	-9.23E-02	1.49E-02	5.28E-03	5.03E-03	2.42E-02	3.54E-04
	Central/South America	-6.41E-03	-9.29E-04	-2.64E-02	9.99E-04	6.71E-04	1.41E-03	-1.21E-03
	Northern Asia	6.50E-02	3.71E-02	4.51E-02	-6.95E-02	1.00E-02	-2.45E-01	-4.85E-03
	Europe	-1.83E-03	-5.02E-03	1.75E-02	1.71E-02	-1.69E-01	1.77E-02	1.89E-03
Natural Soil	North America	1.92E-02	1.62E-02	1.56E-02	1.42E-02	2.02E-02	-1.78E-01	-5.91E-04
	Oceania	5.29E-04	1.89E-03	-5.34E-03	-1.08E-03	3.18E-04	5.79E-04	-4.22E-03
	Africa/Middle East	1	-2.40E-01	-4.60E-01	8.25E-02	-2.58E-02	-9.29E-02	8.97E-04
	Southern Asia	-2.40E-01	1	-1.38E-01	-3.88E-01	4.13E-02	-9.82E-02	6.28E-03
	Central/South America	-4.60E-01	-1.38E-01	1	-4.67E-02	1.33E-03	-1.73E-03	-1.49E-01
	Northern Asia	8.25E-02	-3.88E-01	-4.67E-02	1	-1.62E-01	-1.91E-01	-1.82E-02
Ocean	Europe	-2.58E-02	4.13E-02	1.33E-03	-1.62E-01	1	-9.00E-02	2.10E-03
	North America	-9.29E-02	-9.82E-02	-1.73E-03	-1.91E-01	-9.00E-02	1	1.17E-02
	Oceania	8.97E-04	6.28E-03	-1.49E-01	-1.82E-02	2.10E-03	1.17E-02	1
	North Pacific	-4.82E-04	-2.08E-03	2.21E-03	-3.65E-03	-5.49E-03	-5.10E-03	-6.30E-04
	South Pacific	3.76E-03	7.40E-03	1.55E-03	-1.30E-03	-7.84E-04	2.27E-03	1.19E-03
	Northern Ocean	2.54E-03	5.58E-03	-1.04E-02	-4.48E-03	-4.70E-03	-1.11E-03	-1.93E-03
Biomass burning	Atlantic	1.02E-02	1.81E-02	-3.19E-02	-5.69E-03	-1.33E-04	4.32E-03	-6.88E-03
	Southern Ocean	-1.10E-02	-2.98E-02	5.59E-02	7.86E-03	-2.18E-03	-1.07E-02	2.75E-03
	Indian Ocean	4.76E-03	1.05E-02	-2.28E-02	-5.46E-03	-1.35E-03	9.31E-04	-3.97E-03
	Africa/Middle East	-1.03E-01	-2.61E-02	-8.60E-02	2.18E-02	5.19E-03	1.32E-02	2.83E-03
	Southern Asia	-6.17E-03	-3.42E-03	-2.24E-02	-3.48E-03	-2.20E-03	5.73E-03	-2.29E-03
	Central/South America	-2.29E-02	-1.20E-02	-2.45E-02	9.34E-03	2.93E-03	7.19E-03	2.35E-03
	Northern Asia	1.48E-02	-4.35E-02	9.33E-03	-2.32E-01	-3.53E-02	-1.12E-01	4.19E-03
	Europe	-1.73E-04	5.22E-04	1.01E-04	-3.20E-03	-7.44E-03	-1.08E-03	7.00E-05
	North America	4.16E-03	-1.56E-03	-2.62E-02	-1.30E-02	-7.97E-03	-4.80E-02	-1.67E-03
	Oceania	-7.12E-03	-9.94E-03	-1.44E-02	2.88E-03	2.16E-03	6.22E-03	-3.60E-03

**Fig. S2ak.** Correlation of the emissions in 2002 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	1.70E-03	-1.23E-03	7.37E-05	7.03E-04	4.31E-03	3.03E-04
	Southern Asia	9.53E-03	-9.43E-03	-2.46E-03	-1.12E-02	2.78E-02	-5.27E-03
	Central/South America	8.74E-04	5.53E-04	7.41E-04	2.73E-03	5.52E-03	-5.01E-05
	Northern Asia	2.90E-03	1.29E-03	1.13E-03	-1.61E-03	2.34E-03	-1.67E-04
	Europe	2.69E-03	1.05E-03	2.92E-03	1.14E-03	5.73E-04	7.68E-04
	North America	5.30E-03	-1.85E-03	2.05E-04	-4.59E-03	1.10E-02	-1.16E-03
	Oceania	-6.94E-04	1.50E-03	-1.19E-03	-4.98E-03	-7.78E-04	-2.50E-03
Industrial	Africa/Middle East	3.97E-04	-2.86E-04	-5.90E-05	-2.23E-04	1.11E-03	-5.51E-05
	Southern Asia	8.27E-04	-6.05E-04	-1.93E-04	-1.69E-03	3.18E-03	-8.97E-04
	Central/South America	8.19E-05	2.65E-05	7.45E-05	2.80E-04	4.83E-04	1.47E-05
	Northern Asia	4.94E-04	2.15E-03	1.27E-03	1.69E-03	-2.98E-03	4.55E-04
	Europe	3.35E-03	1.53E-04	2.34E-03	-3.11E-04	2.61E-03	5.98E-04
	North America	1.81E-03	-2.14E-04	4.81E-04	-2.98E-04	1.44E-03	1.15E-04
	Oceania	-5.53E-05	1.09E-04	-9.27E-05	-3.73E-04	-4.19E-05	-1.86E-04
Natural Soil	Africa/Middle East	-4.82E-04	3.76E-03	2.54E-03	1.02E-02	-1.10E-02	4.76E-03
	Southern Asia	-2.08E-03	7.40E-03	5.58E-03	1.81E-02	-2.98E-02	1.05E-02
	Central/South America	2.21E-03	1.55E-03	-1.04E-02	-3.19E-02	5.59E-02	-2.28E-02
	Northern Asia	-3.65E-03	-1.30E-03	-4.48E-03	-5.69E-03	7.86E-03	-5.46E-03
	Europe	-5.49E-03	-7.84E-04	-4.70E-03	-1.33E-04	-2.18E-03	-1.35E-03
	North America	-5.10E-03	2.27E-03	-1.11E-03	4.32E-03	-1.07E-02	9.31E-04
	Oceania	-6.30E-04	1.19E-03	-1.93E-03	-6.88E-03	2.75E-03	-3.97E-03
Ocean	North Pacific		1	-2.07E-02	-7.79E-02	-2.02E-01	2.67E-02
	South Pacific	-2.07E-02		1	-3.92E-03	-9.97E-02	-1.45E-02
	Northern Ocean	-7.79E-02	-3.92E-03		1	-2.80E-01	2.07E-02
	Atlantic	-2.02E-01	-9.97E-02	-2.80E-01		1	-5.24E-02
	Southern Ocean	2.67E-02	-1.45E-02	2.07E-02	-5.24E-02		1
	Indian Ocean	4.37E-02	-3.44E-02	4.46E-03	-2.35E-02	-5.48E-01	
Biomass burning	Africa/Middle East	1.08E-03	-9.66E-04	1.36E-03	4.86E-03	1.18E-03	1.90E-03
	Southern Asia	2.24E-04	-1.14E-03	-5.20E-04	-9.23E-04	3.05E-03	-8.45E-04
	Central/South America	5.37E-04	-1.57E-04	1.22E-03	4.31E-03	-4.06E-04	1.76E-03
	Northern Asia	2.79E-05	1.27E-03	5.91E-04	1.33E-03	-2.58E-03	7.72E-04
	Europe	4.46E-06	4.22E-06	5.29E-06	1.45E-05	-2.27E-05	1.24E-05
	North America	-1.05E-03	7.49E-04	-1.90E-05	8.57E-04	-2.27E-03	-7.00E-05
	Oceania	2.69E-04	2.49E-05	4.99E-04	1.54E-03	-7.40E-04	7.62E-04

**Fig. S2al.** Correlation of the emissions in 2002 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.70E-02	-6.07E-03	-5.15E-03	7.92E-03	-2.46E-05	4.65E-03	-7.53E-04
	Southern Asia	-1.77E-02	-3.16E-02	7.11E-03	-1.18E-02	1.57E-04	1.62E-02	6.23E-03
	Central/South America	-3.53E-02	-3.39E-03	-1.56E-02	6.29E-03	5.54E-05	2.87E-03	-7.36E-03
	Northern Asia	1.23E-02	4.31E-03	2.41E-03	1.59E-02	-3.52E-04	1.82E-02	-2.05E-03
	Europe	5.36E-03	2.59E-03	1.92E-03	-7.03E-03	9.44E-05	1.21E-03	1.56E-03
	North America	7.24E-03	-2.07E-03	4.38E-03	2.63E-02	3.44E-04	2.21E-02	1.94E-03
Industrial	Oceania	5.75E-03	1.90E-03	2.06E-03	1.24E-03	5.55E-05	1.05E-03	-1.46E-03
	Africa/Middle East	-1.95E-03	-7.48E-04	-1.82E-04	1.01E-03	-2.18E-05	1.00E-03	1.47E-04
	Southern Asia	4.07E-03	-6.29E-04	1.78E-03	9.00E-03	7.25E-05	3.94E-03	1.40E-03
	Central/South America	-3.39E-03	-3.49E-04	-1.48E-03	5.82E-04	4.52E-06	2.31E-04	-6.61E-04
	Northern Asia	1.64E-02	4.60E-03	4.19E-03	3.04E-02	3.95E-04	2.93E-02	3.60E-04
	Europe	2.11E-03	1.15E-03	2.70E-04	-3.67E-04	2.59E-04	1.99E-03	2.33E-04
Natural Soil	North America	3.76E-03	-9.99E-05	1.37E-03	1.40E-02	2.71E-04	-8.68E-02	5.67E-05
	Oceania	4.80E-04	1.84E-04	2.08E-04	1.00E-04	4.50E-06	7.35E-06	5.36E-05
	Africa/Middle East	-1.03E-01	-6.17E-03	-2.29E-02	1.48E-02	-1.73E-04	4.16E-03	-7.12E-03
	Southern Asia	-2.61E-02	-3.42E-03	-1.20E-02	-4.35E-02	5.22E-04	-1.56E-03	-9.94E-03
	Central/South America	-8.60E-02	-2.24E-02	-2.45E-02	9.33E-03	1.01E-04	-2.62E-02	-1.44E-02
	Northern Asia	2.18E-02	-3.48E-03	9.34E-03	-2.32E-01	-3.20E-03	-1.30E-02	2.88E-03
Ocean	Europe	5.19E-03	-2.20E-03	2.93E-03	-3.53E-02	-7.44E-03	-7.97E-03	2.16E-03
	North America	1.32E-02	5.73E-03	7.19E-03	-1.12E-01	-1.08E-03	-4.80E-02	6.22E-03
	Oceania	2.83E-03	-2.29E-03	2.35E-03	4.19E-03	7.00E-05	-1.67E-03	-3.60E-03
	North Pacific	1.08E-03	2.24E-04	5.37E-04	2.79E-05	4.46E-06	-1.05E-03	2.69E-04
	South Pacific	-9.66E-04	-1.14E-03	-1.57E-04	1.27E-03	4.22E-06	7.49E-04	2.49E-05
	Northern Ocean	1.36E-03	-5.20E-04	1.22E-03	5.91E-04	5.29E-06	-1.90E-05	4.99E-04
Biomass burning	Atlantic	4.86E-03	-9.23E-04	4.31E-03	1.33E-03	1.45E-05	8.57E-04	1.54E-03
	Southern Ocean	1.18E-03	3.05E-03	-4.06E-04	-2.58E-03	-2.27E-05	-2.27E-03	-7.40E-04
	Indian Ocean	1.90E-03	-8.45E-04	1.76E-03	7.72E-04	1.24E-05	-7.00E-05	7.62E-04
	Africa/Middle East	1	-6.97E-03	-1.91E-02	1.24E-02	6.99E-05	3.99E-03	-6.29E-03
	Southern Asia	-6.97E-03	1	-2.92E-03	5.40E-03	5.81E-05	6.30E-04	-3.10E-03
	Central/South America	-1.91E-02	-2.92E-03	1	3.70E-03	1.96E-05	1.12E-03	-3.94E-03

**Fig. S2am.** Correlation of the emissions in 2002 for biomass burning.

Source sector	Region	Agricultural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -1.05E-01	-3.13E-03	-3.83E-02	-1.74E-02	-1.48E-02	5.40E-03	
	Southern Asia	-1.05E-01	1	3.51E-02	-2.94E-01	4.27E-02	-7.31E-02	1.72E-02
	Central/South America	-3.13E-03	3.51E-02	1	-5.78E-03	7.86E-03	2.62E-03	-1.66E-02
	Northern Asia	-3.83E-02	-2.94E-01	-5.78E-03	1	-1.88E-01	-4.57E-02	-1.48E-02
	Europe	-1.74E-02	4.27E-02	7.86E-03	-1.88E-01	1	-9.85E-03	3.20E-03
	North America	-1.48E-02	-7.31E-02	2.62E-03	-4.57E-02	-9.85E-03	1	5.43E-04
	Oceania	5.40E-03	1.72E-02	-1.66E-02	-1.48E-02	3.20E-03	5.43E-04	1
Industrial	Africa/Middle East	-6.88E-02	-1.64E-02	9.34E-04	-9.55E-03	-6.37E-03	-3.82E-03	7.39E-04
	Southern Asia	1.95E-02	-3.91E-01	-5.02E-04	-4.84E-02	2.06E-02	-3.48E-03	-2.03E-03
	Central/South America	-4.54E-04	2.48E-03	-6.17E-03	-3.64E-04	6.22E-04	1.98E-04	-1.21E-03
	Northern Asia	1.21E-02	-1.32E-02	3.75E-04	-1.10E-01	-3.76E-02	2.02E-01	-2.98E-03
	Europe	-2.28E-02	-2.98E-03	3.23E-03	-3.69E-02	-7.50E-01	-1.28E-02	4.87E-04
	North America	9.08E-03	2.73E-02	1.74E-03	4.12E-02	2.99E-02	-3.83E-01	-5.71E-04
	Oceania	4.35E-04	1.28E-03	-1.20E-03	-9.88E-04	2.08E-04	4.00E-05	-5.66E-03
Natural Soil	Africa/Middle East	-2.24E-01	-1.52E-01	-7.31E-02	-9.90E-03	-8.60E-03	1.39E-02	2.36E-03
	Southern Asia	-4.09E-02	-2.89E-01	4.46E-03	9.35E-02	-9.74E-03	-2.29E-02	1.77E-02
	Central/South America	1.79E-02	8.44E-02	-2.48E-01	9.21E-03	2.00E-02	2.87E-02	5.35E-02
	Northern Asia	3.64E-02	-2.51E-02	-5.35E-03	-2.05E-01	2.28E-02	7.02E-02	-1.54E-02
	Europe	-2.46E-02	-1.81E-02	5.85E-03	7.35E-04	-2.19E-01	2.43E-02	2.80E-03
	North America	-3.69E-02	-8.24E-02	2.37E-02	6.72E-02	-1.68E-02	-4.21E-01	9.57E-03
	Oceania	2.05E-03	1.54E-02	-2.58E-02	-7.02E-03	4.80E-03	1.40E-03	-5.27E-02
Ocean	North Pacific	-1.50E-02	-1.55E-01	2.38E-03	3.17E-02	8.67E-03	-5.61E-02	3.71E-03
	South Pacific	-1.39E-02	-5.63E-03	-3.94E-02	1.65E-02	1.34E-02	1.49E-03	2.65E-02
	Northern Ocean	4.72E-03	-5.59E-03	-5.81E-05	-6.93E-02	-8.71E-02	-9.66E-03	1.93E-03
	Atlantic	-7.68E-02	-1.35E-01	-3.04E-02	-2.78E-02	-5.66E-02	-8.74E-02	9.03E-03
	Southern Ocean	2.43E-02	1.20E-01	-1.83E-01	-2.26E-02	1.27E-02	1.25E-03	-9.08E-02
	Indian Ocean	-3.70E-02	-5.31E-02	-9.33E-02	1.30E-03	2.67E-03	8.54E-03	-2.24E-02
Biomass burning	Africa/Middle East	-2.83E-02	-2.20E-02	-3.42E-02	5.32E-03	4.51E-03	-8.16E-04	4.18E-03
	Southern Asia	-2.14E-03	-3.54E-02	-2.11E-03	-1.09E-03	4.18E-03	-3.57E-03	3.02E-04
	Central/South America	-3.32E-03	2.34E-03	-1.16E-02	-6.35E-04	1.56E-03	1.47E-04	1.06E-03
	Northern Asia	1.37E-02	-7.92E-02	3.75E-03	1.42E-02	4.37E-03	5.48E-02	2.47E-03
	Europe	-1.97E-04	-2.50E-04	6.43E-05	1.36E-04	-2.67E-04	2.98E-04	7.39E-06
	North America	1.31E-03	-1.85E-03	1.22E-03	5.67E-04	-4.54E-03	1.50E-02	3.20E-04
	Oceania	1.60E-04	2.81E-03	-3.84E-03	-9.29E-04	7.02E-04	8.22E-04	-1.83E-03

**Fig. S2an.** Correlation of the emissions in 2003 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-6.88E-02	1.95E-02	-4.54E-04	1.21E-02	-2.28E-02	9.08E-03	4.35E-04
	Southern Asia	-1.64E-02	-3.91E-01	2.48E-03	-1.32E-02	-2.98E-03	2.73E-02	1.28E-03
	Central/South America	9.34E-04	-5.02E-04	-6.17E-03	3.75E-04	3.23E-03	1.74E-03	-1.20E-03
	Northern Asia	-9.55E-03	-4.84E-02	-3.64E-04	-1.10E-01	-3.69E-02	4.12E-02	-9.88E-04
	Europe	-6.37E-03	2.06E-02	6.22E-04	-3.76E-02	-7.50E-01	2.99E-02	2.08E-04
	North America	-3.82E-03	-3.48E-03	1.98E-04	2.02E-01	-1.28E-02	-3.83E-01	4.00E-05
Industrial	Oceania	7.39E-04	-2.03E-03	-1.21E-03	-2.98E-03	4.87E-04	-5.71E-04	-5.66E-03
	Africa/Middle East	1	2.63E-03	5.16E-05	-1.23E-03	-7.71E-03	1.75E-03	5.68E-05
	Southern Asia	2.63E-03	1	4.55E-05	-4.10E-02	3.59E-03	1.10E-02	-1.76E-04
	Central/South America	5.16E-05	4.55E-05	1	2.19E-04	2.65E-04	1.61E-04	-8.74E-05
	Northern Asia	-1.23E-03	-4.10E-02	2.19E-04	1	-3.06E-02	-3.10E-01	-2.44E-04
	Europe	-7.71E-03	3.59E-03	2.65E-04	-3.06E-02	1	8.34E-03	2.91E-05
Natural Soil	North America	1.75E-03	1.10E-02	1.61E-04	-3.10E-01	8.34E-03	1	-5.35E-05
	Oceania	5.68E-05	-1.76E-04	-8.74E-05	-2.44E-04	2.91E-05	-5.35E-05	1
	Africa/Middle East	-3.73E-02	5.84E-02	-6.21E-03	6.26E-02	-6.81E-03	1.60E-02	3.47E-04
	Southern Asia	-4.61E-03	-1.39E-01	-1.48E-06	2.73E-02	-1.34E-02	5.50E-03	1.47E-03
	Central/South America	4.78E-03	7.87E-03	-1.87E-02	1.89E-02	1.09E-02	8.92E-03	-4.50E-03
	Northern Asia	7.23E-03	-8.22E-03	-3.20E-04	-7.46E-02	2.72E-02	2.01E-02	-1.18E-03
Ocean	Europe	-8.00E-03	1.55E-02	3.84E-04	2.81E-02	-1.55E-01	2.69E-02	2.17E-04
	North America	-2.10E-03	7.07E-02	1.43E-03	-2.27E-01	1.68E-02	-2.11E-01	7.25E-04
	Oceania	6.16E-04	-1.69E-03	-2.01E-03	-7.30E-04	1.51E-03	1.28E-04	-3.71E-03
	North Pacific	-4.64E-03	-4.13E-03	1.53E-04	4.31E-02	-1.37E-02	-5.26E-02	2.61E-04
	South Pacific	-6.60E-04	7.21E-03	-5.17E-03	1.53E-02	6.44E-03	1.24E-03	2.71E-03
	Northern Ocean	9.61E-04	-1.15E-02	5.66E-05	3.38E-02	1.64E-02	3.70E-02	1.13E-04
Biomass burning	Atlantic	-1.17E-02	-7.48E-03	-2.72E-03	-2.30E-01	-1.09E-02	-1.10E-01	6.87E-04
	Southern Ocean	2.25E-03	-2.57E-02	-1.26E-02	-7.06E-03	9.58E-04	8.88E-03	-6.99E-03
	Indian Ocean	-2.70E-03	2.25E-02	-7.75E-03	9.47E-03	3.70E-03	-3.04E-03	-2.14E-03
	Africa/Middle East	2.21E-03	9.44E-03	2.94E-03	1.18E-02	3.25E-03	1.45E-03	4.40E-04
	Southern Asia	-3.92E-04	-1.32E-02	-1.78E-04	-1.75E-03	1.08E-03	1.98E-03	2.85E-05
	Central/South America	-2.52E-04	1.21E-03	-9.58E-04	1.64E-03	4.95E-04	-7.07E-05	1.39E-04

**Fig. S2ao.** Correlation of the emissions in 2003 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.24E-01	-4.09E-02	-1.79E-02	3.64E-02	-2.46E-02	-3.69E-02	2.05E-03
	Southern Asia	-1.52E-01	-2.89E-01	8.44E-02	-2.51E-02	-1.81E-02	-8.24E-02	1.54E-02
	Central/South America	-7.31E-02	4.46E-03	-2.48E-01	-5.35E-03	5.85E-03	2.37E-02	-2.58E-02
	Northern Asia	-9.90E-03	9.35E-02	9.21E-03	-2.05E-01	7.35E-04	6.72E-02	-7.02E-03
	Europe	-8.60E-03	-9.74E-03	2.00E-02	2.28E-02	-2.19E-01	-1.68E-02	4.80E-03
	North America	1.39E-02	-2.29E-02	2.87E-02	7.02E-02	2.43E-02	-4.21E-01	1.40E-03
Industrial	Oceania	2.36E-03	1.77E-02	-5.35E-02	-1.54E-02	2.80E-03	9.57E-03	-5.27E-02
	Africa/Middle East	-3.73E-02	-4.61E-03	4.78E-03	7.23E-03	-8.00E-03	-2.10E-03	6.16E-04
	Southern Asia	5.84E-02	-1.39E-01	7.87E-03	-8.22E-03	1.55E-02	7.07E-02	-1.69E-03
	Central/South America	-6.21E-03	-1.48E-06	-1.87E-02	-3.20E-04	3.84E-04	1.43E-03	-2.01E-03
	Northern Asia	6.26E-02	2.73E-02	1.89E-02	-7.46E-02	2.81E-02	-2.27E-01	-7.30E-04
	Europe	-6.81E-03	-1.34E-02	1.09E-02	2.72E-02	-1.55E-01	1.68E-02	1.51E-03
Natural Soil	North America	1.60E-02	5.50E-03	8.92E-03	2.01E-02	2.69E-02	-2.11E-01	1.28E-04
	Oceania	3.47E-04	1.47E-03	-4.50E-03	-1.18E-03	2.17E-04	7.25E-04	-3.71E-03
	Africa/Middle East	1	-1.73E-01	-4.17E-01	1.05E-01	-3.78E-02	-1.57E-01	-1.03E-02
	Southern Asia	-1.73E-01	1	-7.13E-02	-5.42E-01	6.76E-02	2.78E-02	2.32E-03
	Central/South America	-4.17E-01	-7.13E-02	1	-5.48E-02	7.63E-03	-4.24E-03	-1.06E-01
	Northern Asia	1.05E-01	-5.42E-01	-5.48E-02	1	-1.44E-01	-1.95E-01	-2.16E-02
Ocean	Europe	-3.78E-02	6.76E-02	7.63E-03	-1.44E-01	1	-1.35E-01	8.05E-04
	North America	-1.57E-01	2.78E-02	-4.24E-03	-1.95E-01	-1.35E-01	1	1.41E-02
	Oceania	-1.03E-02	2.32E-03	-1.06E-01	-2.16E-02	8.05E-04	1.41E-02	1
	North Pacific	7.36E-02	1.41E-01	2.41E-02	-1.65E-01	6.19E-02	1.31E-01	-2.81E-03
	South Pacific	-1.17E-02	1.58E-02	-5.00E-01	-1.65E-02	3.64E-03	4.14E-02	1.43E-02
	Northern Ocean	6.95E-02	1.05E-01	3.14E-02	-7.07E-02	9.55E-03	-7.01E-03	9.92E-05
Biomass burning	Atlantic	-8.93E-02	8.96E-02	-2.42E-02	1.18E-02	3.78E-02	8.33E-02	-4.21E-03
	Southern Ocean	1.22E-01	1.53E-01	-4.03E-02	-7.77E-02	9.37E-03	6.15E-02	-7.98E-02
	Indian Ocean	-1.81E-01	-9.18E-02	-1.48E-01	3.21E-02	8.10E-03	2.09E-02	-4.58E-02
	Africa/Middle East	-1.27E-01	-1.63E-02	-1.45E-02	1.91E-02	6.33E-03	1.35E-02	-3.85E-03
	Southern Asia	4.34E-03	1.97E-02	-4.32E-03	-4.62E-03	-3.16E-03	9.48E-03	-2.15E-03
	Central/South America	-1.79E-02	2.16E-05	-9.93E-03	6.98E-04	5.37E-04	4.86E-03	-2.14E-03

**Fig. S2ap.** Correlation of the emissions in 2003 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-1.50E-02	-1.39E-02	4.72E-03	-7.68E-02	2.43E-02	-3.70E-02
	Southern Asia	-1.55E-01	-5.63E-03	-5.59E-03	-1.35E-01	1.20E-01	-5.31E-02
	Central/South America	2.38E-03	-3.94E-02	-5.81E-05	-3.04E-02	-1.83E-01	-9.33E-02
	Northern Asia	3.17E-02	1.65E-02	-6.93E-02	-2.78E-02	-2.26E-02	1.30E-03
	Europe	8.67E-03	1.34E-02	-8.71E-02	-5.66E-02	1.27E-02	2.67E-03
	North America	-5.61E-02	1.49E-03	-9.66E-03	-8.74E-02	1.25E-03	8.54E-03
Industrial	Oceania	3.71E-03	2.65E-02	1.93E-03	9.03E-03	-9.08E-02	-2.24E-02
	Africa/Middle East	-4.64E-03	-6.60E-04	9.61E-04	-1.17E-02	2.25E-03	-2.70E-03
	Southern Asia	-4.13E-03	7.21E-03	-1.15E-02	-7.48E-03	-2.57E-02	2.25E-02
	Central/South America	1.53E-04	-5.17E-03	5.66E-05	-2.72E-03	-1.26E-02	-7.75E-03
	Northern Asia	4.31E-02	1.53E-02	3.38E-02	-2.30E-01	-7.06E-03	9.47E-03
	Europe	-1.37E-02	6.44E-03	1.64E-02	-1.09E-02	9.58E-04	3.70E-03
Natural Soil	North America	-5.26E-02	1.24E-03	3.70E-02	-1.10E-01	8.88E-03	-3.04E-03
	Oceania	2.61E-04	2.71E-03	1.13E-04	6.87E-04	-6.99E-03	-2.14E-03
	Africa/Middle East	7.36E-02	-1.17E-02	6.95E-02	-8.93E-02	1.22E-01	-1.81E-01
	Southern Asia	1.41E-01	1.58E-02	1.05E-01	8.96E-02	1.53E-01	-9.18E-02
	Central/South America	2.41E-02	-5.00E-01	3.14E-02	-2.42E-02	-4.03E-02	-1.48E-01
	Northern Asia	-1.65E-01	-1.65E-02	-7.07E-02	1.18E-02	-7.77E-02	3.21E-02
Ocean	Europe	6.19E-02	3.64E-03	9.55E-03	3.78E-02	9.37E-03	8.10E-03
	North America	1.31E-01	4.14E-02	-7.01E-03	8.33E-02	6.15E-02	2.09E-02
	Oceania	-2.81E-03	1.43E-02	9.92E-05	-4.21E-03	-7.98E-02	-4.58E-02
	North Pacific	1	-2.18E-02	-8.19E-02	-2.01E-01	1.96E-02	2.73E-02
	South Pacific	-2.18E-02	1	-7.97E-04	-6.17E-02	6.46E-02	2.35E-03
	Northern Ocean	-8.19E-02	-7.97E-04	1	-3.18E-01	1.78E-02	1.22E-02
Biomass burning	Atlantic	-2.01E-01	-6.17E-02	-3.18E-01	1	-6.46E-02	-2.34E-02
	Southern Ocean	1.96E-02	6.46E-02	1.78E-02	-6.46E-02	1	-6.55E-01
	Indian Ocean	2.73E-02	2.35E-03	1.22E-02	-2.34E-02	-6.55E-01	1
	Africa/Middle East	2.81E-03	-4.97E-02	5.02E-04	-5.63E-02	1.66E-03	-7.44E-02
	Southern Asia	-4.20E-02	-1.09E-02	-1.03E-02	-2.27E-02	4.19E-03	-6.11E-03
	Central/South America	-1.19E-03	-5.17E-02	-1.52E-04	-1.07E-02	-1.52E-02	-2.02E-02

**Fig. S2aq.** Correlation of the emissions in 2003 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.83E-02	-2.14E-03	-3.32E-03	1.37E-02	-1.97E-04	1.31E-03	1.60E-04
	Southern Asia	-2.20E-02	-3.54E-02	2.34E-03	-7.92E-02	-2.50E-04	-1.85E-03	2.81E-03
	Central/South America	-3.42E-02	-2.11E-03	-1.16E-02	3.75E-03	6.43E-05	1.22E-03	-3.84E-03
	Northern Asia	5.32E-03	-1.09E-03	-6.35E-04	1.42E-02	1.36E-04	5.67E-04	-9.29E-04
	Europe	4.51E-03	4.18E-03	1.56E-03	4.37E-03	-2.67E-04	-4.54E-03	7.02E-04
	North America	-8.16E-04	-3.57E-03	1.47E-04	5.48E-02	2.98E-04	1.50E-02	8.22E-04
Industrial	Oceania	4.18E-03	3.02E-04	1.06E-03	2.47E-03	7.39E-06	3.20E-04	-1.83E-03
	Africa/Middle East	-2.21E-03	-3.92E-04	-2.52E-04	3.09E-03	-1.59E-05	3.94E-04	1.32E-04
	Southern Asia	9.44E-03	-1.32E-02	1.21E-03	-1.92E-02	1.48E-04	5.00E-03	5.38E-04
	Central/South America	-2.94E-03	-1.78E-04	-9.58E-04	2.53E-04	5.19E-06	9.40E-05	-2.91E-04
	Northern Asia	1.18E-02	-1.75E-03	1.64E-03	6.08E-02	4.69E-04	2.58E-02	-2.47E-05
	Europe	3.25E-03	1.08E-03	4.95E-04	9.44E-03	-3.49E-04	2.66E-03	3.10E-04
Natural Soil	North America	1.45E-03	1.98E-03	-7.07E-05	3.13E-02	1.58E-04	9.13E-03	5.71E-05
	Oceania	4.40E-04	2.85E-05	1.39E-04	1.91E-04	8.05E-07	2.08E-05	-1.64E-04
	Africa/Middle East	-1.27E-01	4.34E-03	-1.79E-02	2.83E-02	-8.32E-04	2.56E-03	-4.50E-03
	Southern Asia	-1.63E-02	1.97E-02	2.16E-05	8.48E-02	-2.93E-04	7.41E-03	-2.88E-03
	Central/South America	-1.45E-02	-4.32E-03	-9.93E-03	-1.14E-02	3.06E-04	-2.58E-03	-6.48E-03
	Northern Asia	1.91E-02	-4.62E-03	6.98E-04	-2.74E-01	-2.65E-04	-3.28E-02	-5.16E-04
Ocean	Europe	6.33E-03	-3.16E-03	5.37E-04	-5.07E-02	-2.99E-03	-2.39E-02	7.62E-04
	North America	1.35E-02	9.48E-03	4.86E-03	-1.84E-01	-1.39E-03	-1.21E-01	2.43E-03
	Oceania	-3.85E-03	-2.15E-03	-2.14E-03	-2.75E-03	4.69E-05	3.59E-04	-2.66E-03
	North Pacific	2.81E-03	-4.20E-02	-1.19E-03	-2.85E-01	5.86E-04	1.98E-02	8.87E-04
	South Pacific	-4.97E-02	-1.09E-02	-5.17E-02	2.08E-02	1.65E-04	5.21E-03	1.50E-03
	Northern Ocean	-5.02E-04	-1.03E-02	-1.52E-04	-4.01E-02	1.18E-04	-1.32E-02	6.94E-05
Biomass burning	Atlantic	-5.63E-02	-2.27E-02	-1.07E-02	3.46E-02	1.40E-04	5.53E-03	-7.52E-04
	Southern Ocean	1.66E-03	4.19E-03	-1.52E-02	6.88E-04	1.30E-04	6.12E-04	-2.90E-03
	Indian Ocean	-7.44E-02	-6.11E-03	-2.02E-02	2.24E-02	3.28E-05	1.66E-03	-4.98E-03
	Africa/Middle East	1	-2.36E-03	1.12E-02	1.37E-02	2.21E-05	2.88E-03	-2.76E-03
	Southern Asia	-2.36E-03	1	-1.04E-03	-1.18E-02	6.69E-05	1.48E-03	-1.29E-04
	Central/South America	-1.12E-02	-1.04E-03	1	1.39E-03	2.53E-05	5.87E-04	-7.50E-04

**Fig. S2ar.** Correlation of the emissions in 2003 for biomass burning.

Source sector	Region	Agricultural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -1.12E-01	-6.00E-04	-3.26E-02	-2.65E-02	-2.11E-02	8.54E-03	
	Southern Asia	-1.12E-01	1	4.20E-02	-2.93E-01	1.89E-02	-7.89E-02	2.59E-02
	Central/South America	-6.00E-04	4.20E-02	1	-8.09E-03	7.82E-03	6.84E-03	-2.42E-02
	Northern Asia	-3.26E-02	-2.93E-01	-8.09E-03	1	-1.65E-01	-4.82E-02	-2.37E-02
	Europe	-2.65E-02	1.89E-02	7.82E-03	-1.65E-01	1	-1.56E-02	4.34E-03
	North America	-2.11E-02	-7.89E-02	6.84E-03	-4.82E-02	-1.56E-02	1	3.03E-03
	Oceania	8.54E-03	2.59E-02	-2.42E-02	2.37E-02	4.34E-03	3.03E-03	1
Industrial	Africa/Middle East	-7.07E-02	-1.73E-02	1.52E-03	-8.48E-03	-8.75E-03	-4.66E-03	1.28E-03
	Southern Asia	1.63E-02	-4.40E-01	-1.34E-03	-4.40E-02	1.90E-02	4.35E-03	-9.84E-04
	Central/South America	-1.86E-04	3.16E-03	-7.92E-03	-5.86E-04	6.12E-04	5.70E-04	-1.98E-03
	Northern Asia	1.66E-02	-3.33E-02	-1.78E-03	-9.93E-02	-4.99E-02	1.74E-01	-4.51E-03
	Europe	-1.65E-02	-4.62E-03	2.75E-03	-3.49E-02	-7.13E-01	-9.18E-03	8.17E-04
	North America	9.24E-03	3.06E-02	1.70E-03	3.86E-02	2.94E-02	-3.64E-01	-9.79E-04
	Oceania	6.66E-04	1.88E-03	-1.87E-03	-1.40E-03	2.66E-04	2.01E-04	-7.91E-03
Natural Soil	Africa/Middle East	-2.16E-01	-1.03E-01	-8.72E-02	2.48E-03	-1.22E-02	5.34E-03	-2.43E-03
	Southern Asia	-3.17E-02	-3.50E-01	-2.08E-03	4.70E-02	-6.25E-04	2.12E-03	1.33E-02
	Central/South America	5.15E-02	2.92E-02	2.52E-01	2.09E-02	2.04E-02	1.97E-02	3.81E-02
	Northern Asia	3.23E-02	-2.55E-02	6.20E-03	-2.73E-01	3.25E-02	6.60E-02	-8.12E-03
	Europe	-3.11E-02	-7.91E-03	9.26E-03	9.49E-04	-2.70E-01	1.85E-02	3.22E-03
	North America	-3.39E-02	-8.28E-02	2.63E-02	7.27E-02	-1.27E-02	-4.46E-01	7.23E-03
	Oceania	6.66E-03	2.78E-02	-3.61E-02	-1.30E-02	6.79E-03	6.66E-03	-7.29E-02
Ocean	North Pacific	-4.09E-03	-2.12E-01	1.16E-02	4.52E-02	-2.09E-04	-4.47E-02	6.34E-03
	South Pacific	-4.91E-03	-1.12E-02	-9.16E-03	1.33E-02	9.96E-03	2.32E-03	1.85E-02
	Northern Ocean	6.57E-03	-8.30E-03	3.68E-03	-5.57E-02	-8.12E-02	-6.93E-03	3.26E-03
	Atlantic	-8.03E-02	-1.17E-01	-2.03E-02	-4.41E-02	-4.28E-02	-9.28E-02	1.50E-02
	Southern Ocean	4.02E-02	1.20E-01	-2.13E-01	-2.50E-02	1.03E-02	1.02E-02	-9.42E-02
	Indian Ocean	-4.48E-02	-3.96E-02	-9.87E-02	-1.59E-03	5.02E-03	7.31E-03	-2.72E-02
Biomass burning	Africa/Middle East	-3.34E-02	-1.52E-02	-3.34E-02	5.34E-03	3.05E-03	8.49E-04	8.49E-03
	Southern Asia	-6.82E-03	-4.38E-02	4.05E-03	8.29E-03	3.36E-03	-8.38E-03	3.42E-03
	Central/South America	-6.54E-03	6.21E-03	-2.51E-02	-1.91E-03	2.26E-03	1.20E-03	2.85E-03
	Northern Asia	-6.51E-04	-8.60E-03	1.26E-04	1.04E-03	-4.32E-04	2.36E-03	4.92E-04
	Europe	-1.62E-04	1.40E-04	-1.15E-05	5.48E-05	1.21E-04	8.30E-05	-1.08E-06
	North America	4.24E-03	-5.66E-03	3.54E-03	1.20E-02	-8.48E-03	2.99E-02	6.59E-04
	Oceania	-1.54E-03	5.57E-03	-1.30E-02	-2.28E-03	2.21E-03	2.13E-03	1.25E-04

**Fig. S2as.** Correlation of the emissions in 2004 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-7.07E-02	1.63E-02	-1.86E-04	1.66E-02	-1.65E-02	9.24E-03	6.66E-04
	Southern Asia	-1.73E-02	-4.40E-01	3.16E-03	-3.33E-02	-4.62E-03	3.06E-02	1.88E-03
	Central/South America	1.52E-03	-1.34E-03	-7.92E-03	-1.78E-03	2.75E-03	1.70E-03	-1.87E-03
	Northern Asia	-8.48E-03	-4.40E-02	-5.86E-04	-9.93E-02	-3.49E-02	3.86E-02	-1.40E-03
	Europe	-8.75E-03	1.90E-02	6.12E-04	-4.99E-02	-7.13E-01	2.94E-02	2.66E-04
	North America	-4.66E-03	4.35E-03	5.70E-04	1.74E-01	-9.18E-03	-3.64E-01	2.01E-04
Industrial	Oceania	1.28E-03	-9.84E-04	-1.98E-03	-4.51E-03	8.17E-04	-9.79E-04	-7.91E-03
	Africa/Middle East	1	2.22E-03	1.08E-04	-4.30E-04	-5.11E-03	1.65E-03	9.57E-05
	Southern Asia	2.22E-03	1	-4.92E-05	-4.17E-02	3.10E-03	1.24E-02	-1.15E-04
	Central/South America	1.08E-04	-4.92E-05	1	-1.64E-05	2.12E-04	1.74E-04	-1.52E-04
	Northern Asia	-4.30E-04	-4.17E-02	-1.64E-05	1	-2.49E-02	-2.58E-01	-3.59E-04
	Europe	-5.11E-03	3.10E-03	2.12E-04	-2.49E-02	1	5.90E-03	4.58E-05
Natural Soil	North America	1.65E-03	1.24E-02	1.74E-04	-2.58E-01	5.90E-03	1	-7.19E-05
	Oceania	9.57E-05	-1.15E-04	-1.52E-04	-3.59E-04	4.58E-05	-7.19E-05	1
	Africa/Middle East	-3.36E-02	3.78E-02	-7.35E-03	5.44E-02	-6.54E-03	1.85E-02	-2.07E-05
	Southern Asia	-2.73E-03	-6.15E-02	-3.94E-04	2.35E-02	-6.41E-03	1.42E-02	1.25E-03
	Central/South America	-1.74E-04	3.32E-03	-1.99E-02	3.45E-02	9.16E-03	1.05E-02	-3.56E-03
	Northern Asia	7.14E-03	-2.07E-02	5.79E-04	-6.98E-02	2.80E-02	7.74E-03	-7.09E-04
Ocean	Europe	-1.13E-02	1.59E-02	7.24E-04	4.24E-03	-1.75E-01	3.13E-02	2.58E-04
	North America	-1.91E-03	5.97E-02	1.77E-03	-2.12E-01	1.07E-02	-2.42E-01	6.48E-04
	Oceania	1.44E-03	1.02E-03	-2.91E-03	-2.86E-03	2.27E-03	-8.52E-04	-4.49E-03
	North Pacific	-2.62E-03	-1.40E-02	1.04E-03	5.25E-02	-9.06E-03	-3.08E-02	4.16E-04
	South Pacific	-1.20E-04	1.22E-02	-2.32E-03	1.18E-02	4.08E-03	-5.95E-03	2.32E-03
	Northern Ocean	6.11E-04	-6.25E-03	3.78E-04	4.06E-02	5.81E-03	2.91E-02	1.64E-04
Biomass burning	Atlantic	-1.24E-02	-2.49E-04	-1.72E-03	-2.63E-01	-1.15E-02	-1.25E-01	1.00E-03
	Southern Ocean	4.21E-03	-2.06E-02	-1.50E-02	-1.84E-03	1.49E-03	1.22E-02	-6.48E-03
	Indian Ocean	-3.37E-03	1.71E-02	-8.48E-03	3.35E-03	2.42E-03	-3.42E-03	-3.11E-03
	Africa/Middle East	2.77E-03	8.70E-03	2.79E-03	1.37E-02	1.40E-03	3.20E-03	6.42E-04
	Southern Asia	-1.24E-03	-1.29E-03	3.57E-04	6.98E-03	1.84E-03	-2.13E-03	2.47E-04
	Central/South America	-3.91E-04	2.90E-03	-2.03E-03	2.83E-03	6.23E-04	1.17E-03	2.00E-04

**Fig. S2at.** Correlation of the emissions in 2004 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.16E-01	-3.17E-02	-5.15E-02	3.23E-02	-3.11E-02	-3.39E-02	6.66E-03
	Southern Asia	-1.03E-01	-3.50E-01	2.92E-02	-2.55E-02	-7.91E-03	-8.28E-02	2.78E-02
	Central/South America	-8.72E-02	-2.08E-03	-2.52E-01	6.20E-03	9.26E-03	2.63E-02	-3.61E-02
	Northern Asia	2.48E-03	4.70E-02	2.09E-02	-2.73E-01	9.49E-04	7.27E-02	-1.30E-02
	Europe	-1.22E-02	-6.25E-04	2.04E-02	3.25E-02	-2.70E-01	-1.27E-02	6.79E-03
	North America	5.34E-03	2.12E-03	1.97E-02	6.60E-02	1.85E-02	-4.46E-01	6.66E-03
Industrial	Oceania	-2.43E-03	1.33E-02	-3.81E-02	-8.12E-03	3.22E-03	7.23E-03	-7.29E-02
	Africa/Middle East	-3.36E-02	-2.73E-03	-1.74E-04	7.14E-03	-1.13E-02	-1.91E-03	1.44E-03
	Southern Asia	3.78E-02	-6.15E-02	3.32E-03	-2.07E-02	1.59E-02	5.97E-02	1.02E-03
	Central/South America	-7.35E-03	-3.94E-04	-1.99E-02	5.79E-04	7.24E-04	1.77E-03	-2.91E-03
	Northern Asia	5.44E-02	2.35E-02	3.45E-02	-6.98E-02	4.24E-03	-2.12E-01	-2.86E-03
	Europe	-6.54E-03	-6.41E-03	9.16E-03	2.80E-02	-1.75E-01	1.07E-02	2.27E-03
Natural Soil	North America	1.85E-02	1.42E-02	1.05E-02	7.74E-03	3.13E-02	-2.42E-01	-8.52E-04
	Oceania	-2.07E-05	1.25E-03	-3.56E-03	-7.09E-04	2.58E-04	6.48E-04	-4.49E-03
	Africa/Middle East	1	-1.33E-01	-3.92E-01	5.61E-02	-1.66E-02	-1.01E-01	-1.56E-02
	Southern Asia	-1.33E-01	1	-5.26E-02	-3.56E-01	1.88E-02	-4.39E-02	-1.00E-02
	Central/South America	-3.92E-01	-5.26E-02	1	-9.53E-02	-1.04E-02	-4.02E-02	-1.35E-01
	Northern Asia	5.61E-02	-3.56E-01	-9.53E-02	1	-1.30E-01	-1.80E-01	-1.65E-02
Ocean	Europe	-1.66E-02	1.88E-02	-1.04E-02	-1.30E-01	1	-1.17E-01	2.24E-03
	North America	-1.01E-01	-4.39E-02	-4.02E-02	-1.80E-01	-1.17E-01	1	1.70E-02
	Oceania	-1.56E-02	-1.00E-02	-1.35E-01	-1.65E-02	2.24E-03	1.70E-02	1
	North Pacific	8.83E-02	1.57E-01	-1.26E-03	-2.32E-01	2.70E-02	7.99E-02	1.77E-03
	South Pacific	2.12E-02	1.40E-02	-5.68E-01	1.49E-02	1.23E-02	6.11E-02	2.60E-02
	Northern Ocean	6.12E-02	7.94E-02	3.00E-02	-5.47E-02	-4.24E-03	-1.59E-03	5.61E-04
Biomass burning	Atlantic	-8.49E-02	9.52E-02	-4.90E-02	6.75E-02	4.82E-02	8.30E-02	2.54E-03
	Southern Ocean	1.15E-01	1.41E-01	1.03E-02	-4.36E-02	1.71E-03	3.32E-02	-5.71E-02
	Indian Ocean	-1.52E-01	-1.22E-01	-1.70E-01	3.09E-02	1.31E-02	3.35E-02	-4.66E-02
	Africa/Middle East	1.30E-01	-2.75E-02	1.78E-02	2.58E-02	7.20E-03	6.00E-03	2.75E-03
	Southern Asia	1.65E-02	7.77E-03	-2.09E-02	-1.09E-02	-7.73E-03	9.92E-03	-3.88E-03
	Central/South America	-3.64E-02	-1.33E-02	1.37E-02	9.47E-03	4.87E-03	1.07E-02	-1.40E-03
Fig. S2au.	Northern Asia	-5.32E-04	-2.12E-03	-1.03E-03	-2.10E-02	-8.28E-03	-1.29E-02	1.53E-05
	Europe	-7.77E-05	-1.70E-04	2.59E-05	-3.49E-05	-3.62E-03	-1.83E-04	-1.62E-06
	North America	4.54E-03	-1.21E-02	-1.01E-02	-7.07E-02	-5.21E-02	-1.57E-01	1.07E-03
	Oceania	-1.41E-02	-1.27E-02	9.02E-03	5.07E-03	2.39E-03	7.74E-03	-5.58E-03

**Fig. S2au.** Correlation of the emissions in 2004 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-4.09E-03	-4.91E-03	6.57E-03	-8.03E-02	4.02E-02	-4.48E-02
	Southern Asia	-2.12E-01	-1.12E-02	-8.30E-03	-1.17E-01	1.20E-01	-3.96E-02
	Central/South America	1.16E-02	-9.16E-03	3.68E-03	-2.03E-02	-2.13E-01	-9.87E-02
	Northern Asia	4.52E-02	1.33E-02	-5.57E-02	-4.41E-02	-2.50E-02	-1.59E-03
	Europe	-2.09E-04	9.96E-03	-8.12E-02	-4.28E-02	1.03E-02	5.02E-03
	North America	-4.47E-02	2.32E-03	-6.93E-03	-9.28E-02	1.02E-02	7.31E-03
Industrial	Oceania	6.34E-03	1.85E-02	3.26E-03	1.50E-02	-9.42E-02	-2.72E-02
	Africa/Middle East	-2.62E-03	-1.20E-04	6.11E-04	-1.24E-02	4.21E-03	-3.37E-03
	Southern Asia	-1.40E-02	1.22E-02	-6.25E-03	-2.49E-04	-2.06E-02	1.71E-02
	Central/South America	1.04E-03	-2.32E-03	3.78E-04	-1.72E-03	-1.50E-02	-8.48E-03
	Northern Asia	5.25E-02	1.18E-02	4.06E-02	-2.63E-01	-1.84E-03	8.35E-03
	Europe	-9.06E-03	4.08E-03	5.81E-03	-1.15E-02	1.49E-03	2.42E-03
Natural Soil	North America	-3.08E-02	-5.95E-03	2.91E-02	-1.25E-01	1.22E-02	-3.42E-03
	Oceania	4.16E-04	2.32E-03	1.64E-04	1.00E-03	-6.48E-03	-3.11E-03
	Africa/Middle East	8.83E-02	2.12E-02	6.12E-02	-8.49E-02	1.15E-01	-1.52E-01
	Southern Asia	1.57E-01	1.40E-02	7.94E-02	9.52E-02	1.41E-01	-1.22E-01
	Central/South America	-1.26E-03	-5.68E-01	3.00E-02	-4.90E-02	1.03E-02	-1.70E-01
	Northern Asia	-2.32E-01	1.49E-02	-5.47E-02	6.75E-02	-4.36E-02	3.09E-02
Ocean	Europe	2.70E-02	1.23E-02	-4.24E-03	4.82E-02	1.71E-03	1.31E-02
	North America	7.99E-02	6.11E-02	-1.59E-03	8.30E-02	3.32E-02	3.35E-02
	Oceania	1.77E-03	2.60E-02	5.61E-04	2.54E-03	-5.71E-02	-4.66E-02
	North Pacific	1	1	1.44E-02	-9.69E-02	-2.02E-01	3.73E-03
	South Pacific	1.44E-02	1	1	9.11E-03	-5.12E-02	2.37E-02
	Northern Ocean	-9.69E-02	9.11E-03	1	1	-3.18E-01	1.26E-02
Biomass burning	Atlantic	-2.02E-01	-5.12E-02	-3.18E-01	1	-7.36E-02	-2.15E-02
	Southern Ocean	3.73E-03	2.37E-02	1.26E-02	-7.36E-02	1	-6.38E-01
	Indian Ocean	4.70E-02	3.54E-02	2.18E-02	-2.15E-02	-6.38E-01	1
	Africa/Middle East	1.59E-02	-4.58E-02	8.45E-03	-5.29E-02	-8.72E-03	-6.87E-02
	Southern Asia	-3.35E-02	-1.83E-02	-1.22E-02	-4.22E-02	2.04E-02	-1.51E-02
	Central/South America	6.06E-03	-5.18E-02	1.74E-03	-1.96E-02	-4.33E-02	-4.12E-02

**Fig. S2av.** Correlation of the emissions in 2004 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-3.34E-02	-6.82E-03	-6.54E-03	-6.51E-04	-1.62E-04	4.24E-03	-1.54E-03
	Southern Asia	-1.52E-02	-4.38E-02	6.21E-03	-8.60E-03	1.40E-04	-5.66E-03	5.57E-03
	Central/South America	-3.34E-02	4.05E-03	-2.51E-02	1.26E-04	-1.15E-05	3.54E-03	-1.30E-02
	Northern Asia	5.34E-03	8.29E-03	-1.91E-03	1.04E-03	5.48E-05	1.20E-02	-2.28E-03
	Europe	3.05E-03	3.36E-03	2.26E-03	-4.32E-04	1.21E-04	-8.48E-03	2.21E-03
	North America	8.49E-04	-8.38E-03	1.20E-03	2.36E-03	8.30E-05	2.99E-02	2.13E-03
Industrial	Oceania	8.49E-03	3.42E-03	2.85E-03	4.92E-04	-1.08E-06	6.59E-04	1.25E-04
	Africa/Middle East	-2.77E-03	-1.24E-03	-3.91E-04	-4.93E-05	-9.58E-05	1.11E-03	1.06E-04
	Southern Asia	8.70E-03	-1.29E-03	2.90E-03	1.14E-03	7.31E-06	9.52E-03	1.95E-03
	Central/South America	-2.79E-03	3.57E-04	-2.03E-03	5.64E-06	-7.51E-07	2.64E-04	-1.05E-03
	Northern Asia	1.37E-02	6.98E-03	2.83E-03	3.58E-03	-1.13E-04	3.01E-02	7.04E-04
	Europe	1.40E-03	1.84E-03	6.23E-04	4.51E-04	8.11E-05	6.41E-03	8.02E-04
Natural Soil	North America	3.20E-03	-2.13E-03	1.17E-03	2.45E-03	6.61E-05	1.87E-02	2.72E-04
	Oceania	6.42E-04	2.47E-04	2.00E-04	4.57E-05	2.48E-07	6.13E-05	2.01E-06
	Africa/Middle East	-1.30E-01	1.65E-02	-3.64E-02	-5.32E-04	-7.77E-05	4.54E-03	-1.41E-02
	Southern Asia	-2.75E-02	7.77E-03	-1.33E-02	-2.12E-03	-1.70E-04	-1.21E-02	-1.27E-02
	Central/South America	-1.78E-02	-2.09E-02	1.37E-02	-1.03E-03	2.59E-05	-1.01E-02	9.02E-03
	Northern Asia	2.58E-02	-1.09E-02	9.47E-03	-2.110E-02	-3.49E-05	-7.07E-02	5.07E-03
Ocean	Europe	7.20E-03	-7.73E-03	4.87E-03	-8.28E-03	-3.62E-03	-5.21E-02	2.39E-03
	North America	6.00E-03	9.92E-03	1.07E-02	-1.29E-02	-1.83E-04	-1.57E-01	7.74E-03
	Oceania	2.75E-03	-3.88E-03	-1.40E-03	1.53E-05	-1.62E-06	1.07E-03	-5.58E-03
	North Pacific	1.59E-02	-3.35E-02	6.06E-03	-4.73E-03	1.17E-04	-2.41E-02	2.38E-03
	South Pacific	-4.58E-02	-1.83E-02	-5.18E-02	2.00E-03	-7.30E-07	1.18E-02	-8.79E-03
	Northern Ocean	8.45E-03	-1.22E-02	1.74E-03	-2.46E-03	2.02E-04	-3.02E-02	-7.90E-04
Biomass burning	Atlantic	-5.29E-02	-4.22E-02	-1.96E-02	2.16E-03	2.60E-04	2.63E-02	-8.04E-03
	Southern Ocean	-8.72E-03	2.04E-02	-4.33E-02	2.12E-03	-1.79E-05	-3.01E-04	9.91E-04
	Indian Ocean	-6.87E-02	-1.51E-02	-4.12E-02	-0.107E-03	9.12E-06	7.37E-03	-2.41E-02
	Africa/Middle East	1	7.69E-04	-3.07E-02	1.09E-04	6.97E-07	5.20E-03	-1.22E-02
	Southern Asia	7.69E-04	1	2.44E-03	-4.86E-04	3.35E-05	3.56E-03	-2.12E-03
	Central/South America	-3.07E-02	2.44E-03	1	-3.11E-04	-7.68E-07	3.27E-03	-1.04E-02

**Fig. S2aw.** Correlation of the emissions in 2004 for biomass burning.

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1	-8.17E-02	2.54E-04	-3.64E-02	-3.44E-02	-2.13E-02	6.54E-03
	Southern Asia	-8.17E-02	1	5.10E-02	-2.52E-01	2.90E-02	-8.48E-02	2.50E-02
	Central/South America	2.54E-04	5.10E-02	1	-7.63E-03	8.63E-03	9.40E-03	-2.71E-02
	Northern Asia	-3.64E-02	-2.52E-01	-7.63E-03	1	-1.58E-01	-4.29E-02	-2.75E-02
	Europe	-3.44E-02	2.90E-02	8.63E-03	-1.58E-01	1	-1.98E-02	4.38E-03
	North America	-2.13E-02	-8.48E-02	9.40E-03	-4.29E-02	-1.98E-02	1	-1.13E-03
Industrial	Africa/Middle East	-7.78E-02	-1.17E-02	1.63E-03	-9.57E-03	-1.36E-02	-4.40E-03	8.91E-04
	Southern Asia	2.39E-02	-4.14E-01	-1.09E-03	-5.09E-02	2.12E-02	8.12E-03	-1.56E-03
	Central/South America	-1.78E-04	3.82E-03	-8.30E-03	-4.69E-04	7.05E-04	7.62E-04	-2.07E-03
	Northern Asia	8.73E-03	-3.04E-02	-4.50E-04	-1.12E-01	-5.36E-02	1.21E-01	-3.51E-03
	Europe	-2.22E-02	2.23E-03	3.39E-03	-4.23E-02	-7.24E-01	-1.34E-02	2.76E-04
	North America	8.73E-03	3.10E-02	1.26E-03	3.82E-02	3.05E-02	-3.57E-01	-9.40E-04
Natural Soil	Africa/Middle East	-2.01E-01	-2.00E-02	-8.48E-02	2.76E-03	-1.07E-02	4.97E-03	3.72E-03
	Southern Asia	-7.09E-02	-4.07E-01	-1.78E-02	2.99E-02	-4.97E-03	-3.81E-02	3.30E-02
	Central/South America	5.07E-02	4.37E-02	2.81E-01	2.80E-03	2.75E-02	1.61E-02	-4.91E-02
	Northern Asia	4.45E-02	-9.47E-02	8.41E-03	-1.95E-01	2.21E-03	1.11E-01	-2.67E-02
	Europe	-1.21E-02	-4.28E-04	4.92E-03	4.12E-03	-2.60E-01	1.68E-02	6.28E-03
	North America	-2.89E-02	-2.68E-02	2.26E-02	8.50E-02	-5.02E-03	-4.37E-01	1.37E-02
Ocean	Oceania	2.94E-03	2.16E-02	-3.42E-02	-1.44E-02	7.28E-03	4.42E-03	-7.78E-02
	North Pacific	-1.85E-02	-2.44E-01	2.77E-03	3.08E-02	1.71E-03	-5.13E-02	1.21E-02
	South Pacific	-2.46E-03	-1.73E-02	-7.89E-03	1.97E-02	1.25E-02	9.24E-03	1.51E-02
	Northern Ocean	-1.59E-03	-3.38E-02	4.55E-04	-5.33E-02	-7.71E-02	-7.06E-03	5.43E-03
	Atlantic	-8.81E-02	-1.66E-01	-2.34E-02	-3.36E-02	-5.30E-02	-1.00E-01	1.69E-02
	Southern Ocean	2.25E-02	8.01E-02	-1.90E-01	-1.44E-02	6.00E-03	3.82E-03	-8.31E-02
Biomass burning	Indian Ocean	-2.85E-02	3.41E-03	-9.17E-02	-6.89E-03	8.98E-03	1.42E-02	-3.98E-02
	Africa/Middle East	-4.00E-02	-2.13E-02	-3.32E-02	8.10E-03	3.70E-03	-9.86E-04	7.11E-03
	Southern Asia	-4.75E-03	-3.64E-02	2.63E-03	3.29E-03	1.22E-03	-3.32E-03	2.05E-03
	Central/South America	-3.89E-03	2.75E-02	-3.28E-02	6.97E-04	2.97E-03	7.74E-03	5.69E-03
	Northern Asia	2.43E-04	-4.61E-03	1.87E-03	6.61E-03	-3.42E-04	4.14E-03	1.74E-03
	Europe	-2.40E-04	-6.55E-07	6.49E-05	-2.81E-04	-6.19E-05	-7.35E-07	6.42E-06
Biomass burning	North America	1.06E-05	-1.19E-03	2.69E-03	8.21E-03	-1.51E-03	8.82E-03	1.96E-03
	Oceania	4.76E-04	5.74E-03	-5.70E-03	-1.00E-03	1.01E-03	1.50E-03	-5.55E-04

**Fig. S2ax.** Correlation of the emissions in 2005 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-7.78E-02	2.39E-02	-1.78E-04	8.73E-03	-2.22E-02	8.73E-03	5.27E-04
	Southern Asia	-1.17E-02	-4.14E-01	3.82E-03	-3.04E-02	2.23E-03	3.10E-02	1.84E-03
	Central/South America	1.63E-03	-1.09E-03	-8.30E-03	-4.50E-04	3.39E-03	1.26E-03	-2.15E-03
	Northern Asia	-9.57E-03	-5.09E-02	-4.69E-04	-1.12E-01	-4.23E-02	3.82E-02	-1.94E-03
	Europe	-1.36E-02	2.12E-02	7.05E-04	-5.36E-02	-7.24E-01	3.05E-02	3.13E-04
	North America	-4.40E-03	8.12E-03	7.62E-04	1.21E-01	-1.34E-02	-3.57E-01	-1.26E-04
Industrial	Oceania	8.91E-04	-1.56E-03	-2.07E-03	-3.51E-03	2.76E-04	-9.40E-04	-1.18E-02
	Africa/Middle East	1	3.45E-03	1.06E-04	-2.38E-03	8.26E-03	1.71E-03	6.83E-05
	Southern Asia	3.45E-03	1	-1.24E-05	-4.25E-02	4.14E-03	1.26E-02	-1.50E-04
	Central/South America	1.06E-04	-1.24E-05	1	1.44E-04	2.81E-04	1.46E-04	-1.63E-04
	Northern Asia	-2.38E-03	-4.25E-02	1.44E-04	1	-3.40E-02	-2.51E-01	-2.65E-04
	Europe	-8.26E-03	4.14E-03	2.81E-04	-3.40E-02	1	4.49E-03	1.10E-05
Natural Soil	North America	1.71E-03	1.26E-02	1.46E-04	-2.51E-01	4.49E-03	1	-6.79E-05
	Oceania	6.83E-05	-1.50E-04	-1.63E-04	-2.65E-04	1.10E-05	-6.79E-05	1
	Africa/Middle East	-3.25E-02	5.68E-02	-7.16E-03	4.42E-02	-2.79E-03	1.46E-02	3.77E-04
	Southern Asia	-7.13E-03	-5.82E-02	-1.81E-03	2.52E-02	-1.52E-02	6.87E-03	2.87E-03
	Central/South America	1.68E-04	-4.92E-04	-2.13E-02	2.76E-02	8.34E-03	1.03E-02	-4.47E-03
	Northern Asia	9.18E-03	-2.77E-02	6.90E-04	-7.35E-02	3.28E-02	1.46E-02	-2.14E-03
Ocean	Europe	-1.30E-03	1.54E-02	2.92E-04	1.80E-02	-1.80E-01	3.16E-02	5.03E-04
	North America	-1.68E-03	6.28E-02	1.37E-03	-1.40E-01	1.60E-02	-2.12E-01	1.13E-03
	Oceania	8.90E-04	-1.45E-03	-2.74E-03	8.17E-04	1.88E-03	4.23E-04	-5.51E-03
	North Pacific	-4.01E-03	-1.13E-02	1.22E-04	6.32E-02	-1.81E-02	-3.25E-02	9.29E-04
	South Pacific	4.03E-05	8.77E-03	-2.98E-03	1.78E-02	4.59E-03	-1.77E-03	2.43E-03
	Northern Ocean	2.68E-05	-1.03E-02	5.04E-05	3.51E-02	1.59E-02	3.41E-02	4.04E-04
Biomass burning	Atlantic	-1.25E-02	-1.38E-03	-2.32E-03	-2.27E-01	-8.86E-03	-1.18E-01	1.22E-03
	Southern Ocean	2.36E-03	-2.36E-02	-1.29E-02	4.22E-03	-1.84E-03	1.21E-02	-6.18E-03
	Indian Ocean	-1.95E-03	2.08E-02	-7.66E-03	5.50E-03	5.07E-03	-3.37E-03	-3.85E-03
	Africa/Middle East	3.84E-03	1.19E-02	2.84E-03	1.45E-02	2.35E-03	5.18E-04	6.27E-04
	Southern Asia	-8.08E-04	-1.89E-03	1.90E-04	3.87E-03	3.15E-04	-4.37E-04	1.57E-04
	Central/South America	1.50E-04	4.83E-03	-2.76E-03	3.55E-03	1.51E-03	8.99E-04	3.98E-04

**Fig. S2ay.** Correlation of the emissions in 2005 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.01E-01	-7.09E-02	-5.07E-02	4.45E-02	-1.21E-02	-2.89E-02	2.94E-03
	Southern Asia	-2.00E-02	-4.07E-01	4.37E-02	-9.47E-02	-4.28E-04	-2.68E-02	2.16E-02
	Central/South America	-8.48E-02	-1.78E-02	-2.81E-01	8.41E-03	4.92E-03	2.26E-02	-3.42E-02
	Northern Asia	2.76E-03	2.99E-02	2.80E-03	-1.95E-01	4.12E-03	8.50E-02	-1.44E-02
	Europe	-1.07E-02	-4.97E-03	2.75E-02	2.21E-03	-2.60E-01	-5.02E-03	7.28E-03
	North America	4.97E-03	-3.81E-02	1.61E-02	1.11E-01	1.68E-02	-4.37E-01	4.42E-03
Industrial	Oceania	3.72E-03	3.30E-02	-4.91E-02	-2.67E-02	6.28E-03	1.37E-02	-7.78E-02
	Africa/Middle East	-3.25E-02	-7.13E-03	1.68E-04	9.18E-03	-1.30E-03	-1.68E-03	8.90E-04
	Southern Asia	5.68E-02	-5.82E-02	-4.92E-04	-2.77E-02	1.54E-02	6.28E-02	-1.45E-03
	Central/South America	-7.16E-03	-1.81E-03	-2.13E-02	6.90E-04	2.92E-04	1.37E-03	-2.74E-04
	Northern Asia	4.42E-02	2.52E-02	2.76E-02	-7.35E-02	1.80E-02	-1.40E-01	8.17E-04
	Europe	-2.79E-03	-1.52E-02	8.34E-03	3.28E-02	-1.80E-01	1.60E-02	1.88E-03
Natural Soil	North America	1.46E-02	6.87E-03	1.03E-02	1.46E-02	3.16E-02	-2.12E-01	4.23E-04
	Oceania	3.77E-04	2.87E-03	-4.47E-03	-2.14E-03	5.03E-04	1.13E-03	-5.51E-03
	Africa/Middle East	1	-3.32E-01	-3.46E-01	1.08E-01	-3.24E-02	-1.09E-01	-1.23E-02
	Southern Asia	-3.32E-01	1	7.97E-03	-3.61E-01	6.24E-02	2.24E-02	1.71E-02
	Central/South America	-3.46E-01	7.97E-03	1	-1.35E-01	2.64E-03	3.08E-03	-1.02E-01
	Northern Asia	1.08E-01	-3.61E-01	-1.35E-01	1	-1.85E-01	-3.73E-01	-2.98E-02
Ocean	Europe	-3.24E-02	6.24E-02	2.64E-03	-1.85E-01	1	-9.60E-02	3.92E-03
	North America	-1.09E-01	2.24E-02	3.08E-03	-3.73E-01	-9.60E-02	1	2.10E-02
	Oceania	-1.23E-02	1.71E-02	-1.02E-01	-2.98E-02	3.92E-03	2.10E-02	1
	North Pacific	3.47E-02	2.61E-01	3.22E-02	-2.58E-01	6.82E-02	1.06E-01	3.45E-03
	South Pacific	1.64E-02	1.05E-03	-5.30E-01	1.40E-02	6.72E-03	4.62E-02	5.92E-03
	Northern Ocean	3.81E-02	1.31E-01	4.33E-02	-7.35E-02	2.23E-02	-2.15E-02	2.50E-03
Biomass burning	Atlantic	-1.14E-01	1.44E-01	-3.75E-02	4.79E-02	5.55E-02	4.38E-02	-5.44E-03
	Southern Ocean	6.45E-02	1.90E-01	2.10E-02	-7.19E-02	9.23E-03	3.49E-02	-6.12E-02
	Indian Ocean	-9.07E-02	-1.75E-01	-2.08E-01	5.21E-02	5.33E-04	3.40E-02	-4.97E-02
	Africa/Middle East	1.23E-01	-6.03E-02	1.49E-02	4.69E-02	5.19E-04	4.51E-03	-5.05E-03
	Southern Asia	5.68E-03	2.24E-02	-1.32E-02	-7.21E-03	-1.69E-03	4.18E-03	-1.96E-03
	Central/South America	-5.37E-02	-5.77E-02	3.34E-02	3.65E-02	1.86E-03	6.24E-03	-9.31E-03
Biomass burning	Northern Asia	5.52E-04	2.07E-03	-1.43E-04	-7.69E-02	-1.07E-02	-2.52E-02	2.01E-03
	Europe	-3.93E-04	-4.85E-04	1.94E-04	-2.53E-04	-3.89E-03	-5.28E-04	6.16E-05
	North America	-8.60E-04	1.30E-02	-7.48E-03	-5.80E-02	-1.24E-02	-7.26E-02	1.71E-03
	Oceania	-4.59E-03	-6.88E-03	-2.67E-03	1.59E-03	4.78E-04	2.89E-03	-3.21E-03

**Fig. S2az.** Correlation of the emissions in 2005 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-1.85E-02	-2.46E-03	-1.59E-03	-8.81E-02	2.25E-02	-2.85E-02
	Southern Asia	-2.44E-01	-1.73E-02	-3.38E-02	-1.66E-01	8.01E-02	3.41E-03
	Central/South America	2.77E-03	-7.89E-03	4.55E-04	-2.34E-02	-1.90E-01	-9.17E-02
	Northern Asia	3.08E-02	1.97E-02	-5.33E-02	-3.36E-02	-1.44E-02	-6.89E-03
	Europe	1.71E-03	1.25E-02	-7.71E-02	-5.30E-02	6.00E-03	8.98E-03
	North America	-5.13E-02	9.24E-03	-7.06E-03	-1.00E-01	3.82E-03	1.42E-02
Industrial	Oceania	1.21E-02	1.51E-02	5.43E-03	1.69E-02	-8.31E-02	-3.98E-02
	Africa/Middle East	-4.01E-03	4.03E-05	2.68E-05	-1.25E-02	2.36E-03	-1.95E-03
	Southern Asia	-1.13E-02	8.77E-03	-1.03E-02	-1.38E-03	-2.36E-02	2.08E-02
	Central/South America	1.22E-04	-2.98E-03	5.04E-05	-2.32E-03	-1.29E-02	-7.66E-03
	Northern Asia	6.32E-02	1.78E-02	3.51E-02	-2.27E-01	4.22E-03	5.50E-03
	Europe	-1.81E-02	4.59E-03	1.59E-02	-8.86E-03	-1.84E-03	5.07E-03
Natural Soil	North America	-3.25E-02	-1.77E-03	3.41E-02	-1.18E-01	1.21E-02	-3.37E-03
	Oceania	9.29E-04	2.43E-03	4.04E-04	1.22E-03	-6.18E-03	-3.85E-03
	Africa/Middle East	3.47E-02	1.64E-02	3.81E-02	-1.14E-01	6.45E-02	-9.07E-02
	Southern Asia	2.61E-01	1.05E-03	1.31E-01	1.44E-01	1.90E-01	-1.75E-01
	Central/South America	3.22E-02	-5.30E-01	4.33E-02	-3.75E-02	2.10E-02	-2.08E-01
	Northern Asia	-2.58E-01	1.40E-02	-7.35E-02	4.79E-02	-7.19E-02	5.21E-02
Ocean	Europe	6.82E-02	6.72E-03	2.23E-02	5.55E-02	9.23E-03	5.33E-04
	North America	1.06E-01	4.62E-02	-2.15E-02	4.38E-02	3.49E-02	3.40E-02
	Oceania	3.45E-03	5.92E-03	2.50E-03	-5.44E-03	-6.12E-02	-4.97E-02
	North Pacific	1	1.56E-03	-6.28E-02	-1.79E-01	3.49E-02	5.12E-03
	South Pacific	1.56E-03	1	7.39E-03	-5.40E-02	3.83E-02	3.29E-02
	Northern Ocean	-6.28E-02	7.39E-03	1	-3.19E-01	3.22E-02	-3.85E-04
Biomass burning	Atlantic	-1.79E-01	-5.40E-02	-3.19E-01	1	-6.42E-02	-4.06E-02
	Southern Ocean	3.49E-02	3.83E-02	3.22E-02	-6.42E-02	1	-6.51E-01
	Indian Ocean	5.12E-03	3.29E-02	-3.85E-04	-4.06E-02	-6.51E-01	1
	Africa/Middle East	5.36E-03	-5.95E-02	2.77E-04	-6.92E-02	1.25E-02	-7.30E-02
	Southern Asia	-1.04E-02	-1.06E-02	-2.91E-03	-1.69E-02	1.52E-02	-1.38E-02
	Central/South America	-7.95E-03	-6.72E-02	-4.78E-03	-3.14E-02	-6.09E-02	-4.75E-02

**Fig. S2ba.** Correlation of the emissions in 2005 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-4.00E-02	-4.75E-03	-3.89E-03	2.43E-04	-2.40E-04	1.06E-05	4.76E-04
	Southern Asia	-2.13E-02	-3.64E-02	2.75E-02	-4.61E-03	-6.55E-07	-1.19E-03	5.74E-03
	Central/South America	-3.32E-02	2.63E-03	-3.28E-02	1.87E-03	6.49E-05	2.69E-03	-5.70E-03
	Northern Asia	8.10E-03	3.29E-03	6.97E-04	6.61E-03	-2.81E-04	8.21E-03	-1.00E-03
	Europe	3.70E-03	1.22E-03	2.97E-03	-3.42E-04	-6.19E-05	-1.51E-03	1.01E-03
	North America	-9.86E-04	-3.32E-03	7.74E-03	4.14E-03	-7.35E-07	8.82E-03	1.50E-03
Industrial	Oceania	7.11E-03	2.05E-03	5.69E-03	1.74E-03	6.42E-06	1.96E-03	-5.55E-04
	Africa/Middle East	-3.84E-03	-8.08E-04	1.50E-04	9.24E-05	-4.47E-05	1.95E-04	1.82E-04
	Southern Asia	1.19E-02	-1.89E-03	4.83E-03	3.40E-03	1.34E-04	4.69E-03	3.75E-04
	Central/South America	-2.84E-03	1.90E-04	-2.76E-03	1.36E-04	5.19E-06	1.80E-04	-4.66E-04
	Northern Asia	1.45E-02	3.87E-03	3.55E-03	1.10E-02	-1.06E-04	1.46E-02	6.64E-05
	Europe	2.35E-03	3.15E-04	1.51E-03	2.49E-04	1.98E-04	2.29E-03	3.99E-04
Natural Soil	North America	5.18E-04	-4.37E-04	8.99E-04	6.07E-03	1.57E-04	2.22E-04	3.89E-07
	Oceania	6.27E-04	1.57E-04	3.98E-04	1.43E-04	4.81E-07	1.58E-04	-3.67E-05
	Africa/Middle East	-1.23E-01	5.68E-03	-5.37E-02	5.52E-04	-3.93E-04	-8.60E-04	-4.59E-03
	Southern Asia	-6.03E-02	2.24E-02	-5.77E-02	2.07E-03	-4.85E-04	1.30E-02	-6.88E-03
	Central/South America	-1.49E-02	-1.32E-02	3.34E-02	-1.43E-04	1.94E-04	-7.48E-03	-2.67E-03
	Northern Asia	4.69E-02	-7.21E-03	3.65E-02	-7.69E-02	-2.53E-04	-5.80E-02	1.59E-03
Ocean	Europe	5.19E-04	-1.69E-03	1.86E-03	-1.07E-02	-3.89E-03	-1.24E-02	4.78E-04
	North America	4.51E-03	4.18E-03	6.24E-03	-2.52E-02	-5.28E-04	-7.26E-02	2.89E-03
	Oceania	-5.05E-03	-1.96E-03	-9.31E-03	2.01E-03	6.16E-05	1.71E-03	-3.21E-03
	North Pacific	-5.36E-03	-1.04E-02	-7.95E-03	7.97E-04	2.68E-04	-9.71E-03	-1.01E-03
	South Pacific	-5.95E-02	-1.06E-02	-6.72E-02	6.45E-03	1.36E-04	5.54E-03	-1.10E-03
	Northern Ocean	-2.77E-04	-2.91E-03	-4.78E-03	-6.26E-04	2.86E-04	-8.05E-03	-1.02E-03
Biomass burning	Atlantic	-6.92E-02	-1.69E-02	-3.14E-02	8.37E-03	2.80E-04	9.34E-03	-2.90E-03
	Southern Ocean	-1.25E-02	1.52E-02	-6.09E-02	2.08E-03	-3.19E-05	3.11E-03	-1.91E-03
	Indian Ocean	-7.30E-02	-1.38E-02	-4.75E-02	1.09E-03	1.18E-04	3.31E-03	-8.09E-03
	Africa/Middle East	1	-2.95E-03	3.91E-02	2.07E-03	2.42E-05	2.29E-03	-3.16E-03
	Southern Asia	-2.95E-03	1	2.40E-03	5.19E-06	3.56E-05	2.81E-04	1.30E-05
	Central/South America	-3.91E-02	2.40E-03	1	8.64E-04	4.42E-05	1.33E-03	-4.70E-03

**Fig. S2bb.** Correlation of the emissions in 2005 for biomass burning.

Source sector	Region	Agricultural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -1.03E-01	5.33E-04	-4.51E-02	-1.52E-02	-2.96E-02	7.23E-03	
	Southern Asia	-1.03E-01	1	5.26E-02	-3.24E-01	3.97E-02	-8.40E-02	2.47E-02
	Central/South America	5.33E-04	5.26E-02	1	-5.35E-03	7.55E-03	1.72E-02	-2.47E-02
	Northern Asia	-4.51E-02	-3.24E-01	-5.35E-03	1	-1.72E-01	-4.21E-02	-2.25E-02
	Europe	-1.52E-02	3.97E-02	7.55E-03	-1.72E-01	1	-1.97E-02	4.60E-03
	North America	-2.96E-02	-8.40E-02	1.72E-02	-4.21E-02	-1.97E-02	1	4.11E-03
Industrial	Africa/Middle East	-8.66E-02	-1.39E-02	2.23E-03	-9.44E-03	-7.60E-03	-5.63E-03	1.14E-03
	Southern Asia	2.17E-02	-4.78E-01	-4.30E-03	-4.38E-02	1.79E-02	1.61E-02	-2.70E-03
	Central/South America	-1.12E-04	4.17E-03	-9.08E-03	-3.76E-04	6.25E-04	1.32E-03	-1.92E-03
	Northern Asia	1.28E-02	-3.46E-02	-3.84E-03	-1.19E-01	-5.40E-02	1.57E-01	-5.16E-03
	Europe	-1.63E-02	-3.15E-04	4.24E-03	-2.00E-02	-7.46E-01	-1.52E-02	4.12E-04
	North America	8.68E-03	3.20E-02	1.48E-03	3.02E-02	2.01E-02	-3.65E-01	-7.10E-04
Natural Soil	Oceania	5.80E-04	1.85E-03	-1.91E-03	-1.48E-03	3.05E-04	2.92E-04	-6.90E-03
	Africa/Middle East	-2.24E-01	-1.22E-01	-1.22E-01	-6.30E-03	-1.18E-02	-1.31E-02	-2.09E-03
	Southern Asia	-3.59E-02	-3.33E-01	6.39E-03	6.60E-02	1.80E-04	-2.04E-02	1.77E-02
	Central/South America	5.09E-02	1.38E-02	2.48E-01	6.46E-03	1.84E-02	1.43E-02	3.54E-02
	Northern Asia	4.28E-02	2.11E-01	2.27E-03	-2.20E-01	2.91E-02	3.62E-02	-1.23E-02
	Europe	-2.51E-02	-4.34E-02	1.14E-02	-2.09E-02	-2.67E-01	1.80E-02	3.44E-03
Ocean	North America	-2.07E-02	-1.03E-01	2.82E-02	6.45E-02	1.31E-02	-4.16E-01	7.84E-03
	Oceania	5.38E-03	2.19E-02	-2.72E-02	-1.76E-02	6.45E-03	1.03E-02	-5.62E-02
	North Pacific	-3.92E-03	-2.22E-01	1.18E-02	1.78E-02	2.01E-03	-3.63E-02	6.64E-03
	South Pacific	-5.65E-04	1.81E-03	-2.23E-02	1.01E-02	8.89E-03	1.45E-02	6.87E-03
	Northern Ocean	1.70E-03	-1.37E-02	2.39E-03	-5.80E-02	-6.52E-02	-9.19E-03	2.79E-03
	Atlantic	-8.79E-02	-1.02E-01	-2.53E-02	-2.61E-02	-3.96E-02	-9.53E-02	1.40E-02
Biomass burning	Southern Ocean	3.17E-02	1.15E-01	-2.17E-01	-1.37E-02	1.05E-02	1.52E-02	-7.09E-02
	Indian Ocean	-3.29E-02	-2.57E-02	-1.05E-01	-9.05E-03	4.61E-03	2.04E-02	-4.62E-02
	Africa/Middle East	-3.16E-02	-1.80E-02	-4.29E-02	1.01E-02	2.09E-03	3.31E-03	5.95E-03
	Southern Asia	6.38E-03	2.31E-02	-1.20E-02	-3.04E-02	6.86E-03	1.03E-02	-2.82E-03
	Central/South America	-3.36E-03	7.72E-03	-1.67E-02	3.17E-04	1.05E-03	3.61E-03	7.02E-04
	Northern Asia	6.43E-04	-4.69E-02	4.91E-03	-6.72E-03	1.77E-03	1.32E-02	9.31E-04
Fig. S2bc.	Europe	-1.11E-04	-4.52E-05	-1.55E-05	2.09E-04	6.36E-04	6.31E-05	5.92E-06
	North America	-1.23E-03	-1.04E-02	2.04E-03	3.43E-03	-1.27E-04	1.56E-03	9.85E-04
	Oceania	-1.73E-04	6.79E-03	-1.11E-02	-3.89E-03	1.83E-03	3.82E-03	-4.12E-03

**Fig. S2bc.** Correlation of the emissions in 2006 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-8.66E-02	2.17E-02	-1.12E-04	1.28E-02	-1.63E-02	8.68E-03	5.80E-04
	Southern Asia	-1.39E-02	-4.78E-01	4.17E-03	-3.46E-02	-3.15E-04	3.20E-02	1.85E-03
	Central/South America	2.23E-03	-4.30E-03	-9.08E-03	-3.84E-03	4.24E-03	1.48E-03	-1.91E-03
	Northern Asia	-9.44E-03	-4.38E-02	-3.76E-04	-1.19E-01	-2.00E-02	3.02E-02	-1.48E-03
	Europe	-7.60E-03	1.79E-02	6.25E-04	-5.40E-02	-7.46E-01	2.01E-02	3.05E-04
	North America	-5.63E-03	1.61E-02	1.32E-03	1.57E-01	-1.52E-02	-3.65E-01	2.92E-04
Industrial	Oceania	1.14E-03	-2.70E-03	-1.92E-03	-5.16E-03	4.12E-04	-7.10E-04	-6.90E-03
	Africa/Middle East	1	2.96E-03	1.64E-04	-1.20E-03	-6.33E-03	1.45E-03	8.72E-05
	Southern Asia	2.96E-03	1	-3.28E-04	-4.49E-02	4.40E-03	1.02E-02	-2.65E-04
	Central/South America	1.64E-04	-3.28E-04	1	-1.04E-04	3.66E-04	1.87E-04	-1.49E-04
	Northern Asia	-1.20E-03	-4.49E-02	-1.04E-04	1	-2.63E-02	-1.96E-01	-4.23E-04
	Europe	-6.33E-03	4.40E-03	3.66E-04	-2.63E-02	1	3.89E-03	2.05E-05
Natural Soil	North America	1.45E-03	1.02E-02	1.87E-04	-1.96E-01	3.89E-03	1	-5.54E-05
	Oceania	8.72E-05	-2.65E-04	-1.49E-04	-4.23E-04	2.05E-05	-5.54E-05	1
	Africa/Middle East	-3.39E-02	5.41E-02	-1.05E-02	5.72E-02	-2.88E-03	1.44E-02	-2.08E-05
	Southern Asia	-3.59E-03	-8.49E-02	3.62E-04	1.36E-02	-1.27E-02	8.60E-03	1.78E-03
	Central/South America	-1.36E-04	1.27E-03	-1.92E-02	4.16E-02	9.32E-03	1.43E-02	-3.42E-03
	Northern Asia	5.92E-03	3.95E-02	2.67E-04	-4.62E-02	2.14E-02	-9.92E-04	-1.22E-03
Ocean	Europe	-6.21E-03	8.89E-03	8.07E-04	2.61E-02	-1.76E-01	3.87E-02	2.85E-04
	North America	9.31E-04	4.72E-02	1.95E-03	-3.00E-01	2.38E-02	-2.51E-01	6.92E-04
	Oceania	1.29E-03	6.55E-04	-2.08E-03	-2.80E-03	2.26E-03	3.81E-04	-3.79E-03
	North Pacific	-2.35E-03	-1.15E-02	8.38E-04	5.02E-02	-3.81E-03	-2.80E-02	4.51E-04
	South Pacific	1.00E-03	1.17E-02	-3.68E-03	7.65E-03	6.40E-03	-4.27E-03	1.55E-03
	Northern Ocean	3.58E-04	-7.84E-03	2.49E-04	2.59E-02	1.60E-02	2.73E-02	1.99E-04
Biomass burning	Atlantic	-1.46E-02	-2.18E-03	-2.60E-03	-2.25E-01	-2.49E-02	-9.46E-02	1.01E-03
	Southern Ocean	3.33E-03	-2.78E-02	-1.49E-02	-2.81E-03	8.47E-04	9.56E-03	-5.63E-03
	Indian Ocean	-7.74E-04	2.12E-02	-9.13E-03	2.97E-03	5.32E-03	-4.18E-03	-4.60E-03
	Africa/Middle East	2.28E-03	1.04E-02	3.75E-03	1.62E-02	3.28E-03	2.77E-03	5.76E-04
	Southern Asia	1.08E-03	2.21E-02	-9.22E-04	1.29E-03	4.64E-03	-3.22E-03	-5.60E-05
	Central/South America	-1.68E-05	1.94E-03	-1.46E-03	2.50E-03	9.59E-04	6.29E-04	1.40E-04

**Fig. S2bd.** Correlation of the emissions in 2006 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.24E-01	-3.59E-02	-5.09E-02	4.28E-02	-2.51E-02	-2.07E-02	5.38E-03
	Southern Asia	-1.22E-01	-3.33E-01	1.38E-02	2.11E-01	-4.34E-02	-1.03E-01	2.19E-02
	Central/South America	-1.22E-01	6.39E-03	-2.48E-01	2.27E-03	1.14E-02	2.82E-02	-2.72E-02
	Northern Asia	-6.30E-03	6.60E-02	6.46E-03	-2.20E-01	-2.09E-02	6.45E-02	-1.76E-02
	Europe	-1.18E-02	1.80E-04	1.84E-02	2.91E-02	-2.67E-01	1.31E-02	6.45E-03
	North America	-1.31E-02	-2.04E-02	1.43E-02	3.62E-02	1.80E-02	-4.16E-01	1.03E-02
Industrial	Oceania	-2.09E-03	1.77E-02	-3.54E-02	-1.23E-02	3.44E-03	7.84E-03	-5.62E-02
	Africa/Middle East	-3.39E-02	-3.59E-03	-1.36E-04	5.92E-03	-6.21E-03	9.31E-04	1.29E-03
	Southern Asia	5.41E-02	-8.49E-02	1.27E-03	3.95E-02	8.89E-03	4.72E-02	6.55E-04
	Central/South America	-1.05E-02	3.62E-04	-1.92E-02	2.67E-04	8.07E-04	1.95E-03	-2.08E-03
	Northern Asia	5.72E-02	1.36E-02	4.16E-02	-4.62E-02	2.61E-02	-3.00E-01	-2.80E-03
	Europe	-2.88E-03	-1.27E-02	9.32E-03	2.14E-02	-1.76E-01	2.38E-02	2.26E-03
Natural Soil	North America	1.44E-02	8.60E-03	1.43E-02	-9.92E-02	3.87E-02	-2.51E-01	3.81E-04
	Oceania	-2.08E-05	1.78E-03	-3.42E-03	-1.22E-03	2.85E-04	6.92E-04	-3.79E-03
	Africa/Middle East	1	-1.74E-01	-3.43E-01	1.55E-01	-2.39E-02	-1.02E-01	1.41E-04
	Southern Asia	-1.74E-01	1	-5.87E-02	-7.52E-01	3.87E-02	2.72E-02	-2.24E-02
	Central/South America	-3.43E-01	-5.87E-02	1	-3.56E-02	-3.22E-02	-6.75E-02	-1.76E-01
	Northern Asia	1.55E-01	-7.52E-01	-3.56E-02	1	-6.11E-02	-7.48E-02	7.43E-03
Ocean	Europe	-2.39E-02	3.87E-02	-3.22E-02	-6.11E-02	1	-1.63E-01	-2.31E-03
	North America	-1.02E-01	2.72E-02	-6.75E-02	-7.48E-02	-1.63E-01	1	5.91E-03
	Oceania	1.41E-04	-2.24E-02	-1.76E-01	7.43E-03	-2.31E-03	5.91E-03	1
	North Pacific	1.19E-01	1.35E-01	-3.73E-02	-1.47E-01	1.81E-02	4.35E-02	-3.62E-03
	South Pacific	1.92E-02	1.02E-03	-5.28E-01	1.97E-02	1.84E-02	5.82E-02	-6.44E-04
	Northern Ocean	6.76E-02	8.86E-02	2.98E-02	-7.22E-02	-1.48E-02	-1.25E-02	-1.23E-03
Biomass burning	Atlantic	-7.77E-02	9.99E-02	-5.34E-02	-2.95E-02	6.60E-02	3.35E-02	1.68E-03
	Southern Ocean	1.11E-01	1.58E-01	1.71E-03	-1.11E-01	4.06E-03	4.35E-02	-3.70E-02
	Indian Ocean	-1.84E-01	-1.26E-01	-1.68E-01	9.14E-02	1.44E-02	3.33E-02	-5.56E-02
	Africa/Middle East	-1.63E-01	-2.37E-02	3.23E-02	2.73E-02	9.34E-03	1.12E-02	9.85E-03
	Southern Asia	1.35E-02	-1.65E-01	2.16E-02	1.30E-01	-8.96E-04	1.07E-02	-1.04E-02
	Central/South America	-3.59E-02	-1.08E-02	2.40E-02	1.03E-02	3.46E-03	5.54E-03	2.37E-03

**Fig. S2be.** Correlation of the emissions in 2006 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-3.92E-03	-5.65E-04	1.70E-03	-8.79E-02	3.17E-02	-3.29E-02
	Southern Asia	-2.22E-01	1.81E-03	-1.37E-02	-1.02E-01	1.15E-01	-2.57E-02
	Central/South America	1.18E-02	-2.23E-02	2.39E-03	-2.53E-02	-2.17E-01	-1.05E-01
	Northern Asia	1.78E-02	1.01E-02	-5.80E-02	-2.61E-02	-1.37E-02	-9.05E-03
	Europe	2.01E-03	8.89E-03	-6.52E-02	-3.96E-02	1.05E-02	4.61E-03
	North America	-3.63E-02	1.45E-02	-9.19E-03	-9.53E-02	1.52E-02	2.04E-02
Industrial	Oceania	6.64E-03	6.87E-03	2.79E-03	1.40E-02	-7.09E-02	-4.62E-02
	Africa/Middle East	-2.35E-03	1.00E-03	3.58E-04	-1.46E-02	3.33E-03	-7.74E-04
	Southern Asia	-1.15E-02	1.17E-02	-7.84E-03	-2.18E-03	-2.78E-02	2.12E-02
	Central/South America	8.38E-04	-3.68E-03	2.49E-04	-2.60E-03	-1.49E-02	-9.13E-03
	Northern Asia	5.02E-02	7.65E-03	2.59E-02	-2.25E-01	-2.81E-03	2.97E-03
	Europe	-3.81E-03	6.40E-03	1.60E-02	-2.49E-02	8.47E-04	5.32E-03
Natural Soil	North America	-2.80E-02	-4.27E-03	2.73E-02	-9.46E-02	9.56E-03	-4.18E-03
	Oceania	4.51E-04	1.55E-03	1.99E-04	1.01E-03	-5.63E-03	-4.60E-03
	Africa/Middle East	1.19E-01	1.92E-02	6.76E-02	-7.77E-02	1.11E-01	-1.84E-01
	Southern Asia	1.35E-01	1.02E-03	8.86E-02	9.99E-02	1.58E-01	-1.26E-01
	Central/South America	-3.73E-02	-5.28E-01	2.98E-02	-5.34E-02	1.71E-03	-1.68E-01
	Northern Asia	-1.47E-01	1.97E-02	-7.22E-02	-2.95E-02	-1.11E-01	9.14E-02
Ocean	Europe	1.81E-02	1.84E-02	-1.48E-02	6.60E-02	4.06E-03	1.44E-02
	North America	4.35E-02	5.82E-02	-1.25E-02	3.35E-02	4.35E-02	3.33E-02
	Oceania	-3.62E-03	-6.44E-04	-1.23E-03	1.68E-03	-3.70E-02	-5.56E-02
	North Pacific	1	2.29E-02	-1.11E-01	-2.18E-01	1.37E-02	4.90E-02
	South Pacific	2.29E-02	1	1.23E-02	-5.39E-02	4.20E-02	1.99E-02
	Northern Ocean	-1.11E-01	1.23E-02	1	-3.07E-01	2.10E-02	1.47E-02
Biomass burning	Atlantic	-2.18E-01	-5.39E-02	-3.07E-01	1	-8.81E-02	-2.92E-02
	Southern Ocean	1.37E-02	4.20E-02	2.10E-02	-8.81E-02	1	-6.25E-01
	Indian Ocean	4.90E-02	1.99E-02	1.47E-02	-2.92E-02	-6.25E-01	1
	Africa/Middle East	1.51E-02	-6.28E-02	6.25E-03	-7.15E-02	8.36E-04	-7.00E-02
	Southern Asia	-1.93E-02	-1.63E-02	-1.70E-02	-3.28E-02	3.39E-02	-5.17E-02
	Central/South America	2.13E-03	-3.66E-02	9.58E-05	-1.75E-02	-3.48E-02	-2.77E-02

**Fig. S2bf.** Correlation of the emissions in 2006 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-3.16E-02	6.38E-03	-3.36E-03	6.43E-04	-1.11E-04	-1.23E-03	-1.73E-04
	Southern Asia	-1.80E-02	2.31E-02	7.72E-03	-4.69E-02	-4.52E-05	-1.04E-02	6.79E-03
	Central/South America	-4.29E-02	-1.20E-02	-1.67E-02	4.91E-03	-1.55E-05	2.04E-03	-1.11E-02
	Northern Asia	1.01E-02	-3.04E-02	3.17E-04	-6.72E-03	2.09E-04	3.43E-03	-3.89E-03
	Europe	2.09E-03	6.86E-03	1.05E-03	1.77E-03	6.36E-04	-1.27E-04	1.83E-03
	North America	3.31E-03	1.03E-02	3.61E-03	1.32E-02	6.31E-05	1.56E-03	3.82E-03
Industrial	Oceania	5.95E-03	-2.82E-03	7.02E-04	9.31E-04	5.92E-06	9.85E-04	-4.12E-03
	Africa/Middle East	-2.28E-03	1.08E-03	-1.68E-05	6.47E-04	-1.50E-05	1.01E-04	2.58E-04
	Southern Asia	1.04E-02	2.21E-02	1.94E-03	8.82E-04	-1.88E-05	1.37E-03	1.33E-03
	Central/South America	-3.75E-03	-9.22E-04	-1.46E-03	3.45E-04	-1.66E-06	1.28E-04	-9.11E-04
	Northern Asia	1.62E-02	1.29E-03	2.50E-04	2.41E-02	-1.87E-06	1.47E-02	6.05E-04
	Europe	3.28E-03	4.64E-03	9.59E-04	2.35E-03	5.62E-04	4.09E-03	9.33E-04
Natural Soil	North America	2.77E-03	-3.22E-03	6.29E-04	1.64E-02	8.66E-05	9.60E-03	1.52E-04
	Oceania	5.76E-04	-5.60E-05	1.40E-04	1.04E-04	5.96E-07	8.32E-05	-4.63E-04
	Africa/Middle East	-1.63E-01	1.35E-02	-3.59E-02	-7.01E-04	-1.18E-04	-1.77E-04	-1.40E-02
	Southern Asia	-2.37E-02	-1.65E-01	-1.08E-02	2.42E-04	4.63E-05	1.24E-02	-1.10E-02
	Central/South America	3.23E-02	2.16E-02	2.40E-02	-2.06E-02	4.23E-05	-1.01E-02	1.26E-02
	Northern Asia	2.73E-02	1.30E-01	1.03E-02	-3.42E-02	-7.60E-05	-1.99E-02	7.89E-03
Ocean	Europe	9.34E-03	-8.96E-04	3.46E-03	-4.96E-02	-6.02E-03	-2.57E-02	1.90E-03
	North America	1.12E-02	1.07E-02	5.54E-03	-1.05E-01	-2.26E-04	-6.87E-02	4.49E-03
	Oceania	9.85E-03	-1.04E-02	2.37E-03	-1.20E-03	-1.57E-05	-1.27E-03	-7.46E-03
	North Pacific	1.51E-02	-1.93E-02	2.13E-03	-5.89E-02	1.23E-04	-1.04E-02	1.07E-03
	South Pacific	-6.28E-02	-1.63E-02	-3.66E-02	1.73E-02	-2.01E-05	4.43E-03	-6.40E-03
	Northern Ocean	6.25E-03	-1.70E-02	9.58E-05	-1.62E-02	-5.10E-05	-2.02E-02	-6.25E-04
Biomass burning	Atlantic	-7.15E-02	-3.28E-02	-1.75E-02	3.12E-02	-3.13E-05	1.02E-03	-7.54E-03
	Southern Ocean	-8.36E-04	3.39E-02	-3.48E-02	5.07E-03	1.08E-05	2.47E-03	-1.24E-03
	Indian Ocean	-7.00E-02	-5.17E-02	-2.77E-02	6.40E-03	1.26E-05	3.75E-03	-1.98E-02
	Africa/Middle East	1	-1.48E-02	2.46E-02	6.51E-03	-2.38E-05	2.24E-03	-1.07E-02
	Southern Asia	-1.48E-02	1	-9.20E-03	-1.06E-02	-4.26E-05	-1.81E-03	-2.01E-02
	Central/South America	-2.46E-02	-9.20E-03	1	1.68E-03	-1.50E-05	4.06E-04	-5.53E-03

**Fig. S2bg.** Correlation of the emissions in 2006 for biomass burning.

		Agricultural Soil							
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania	
Agricultural Soil	Africa/Middle East	1	-7.49E-02	-4.04E-03	-4.21E-02	-2.63E-02	-1.69E-02	6.13E-03	
	Southern Asia	-7.49E-02	1	3.11E-02	-2.80E-01	4.85E-02	-6.17E-02	2.13E-02	
	Central/South America	-4.04E-03	3.11E-02	1	-3.71E-03	9.94E-03	8.49E-03	-2.21E-02	
	Northern Asia	-4.21E-02	-2.80E-01	-3.71E-03	1	-1.86E-01	-5.01E-02	-2.92E-02	
	Europe	-2.63E-02	4.85E-02	9.94E-03	-1.86E-01	1	-2.11E-02	5.14E-03	
	North America	-1.69E-02	-6.17E-02	8.49E-03	-5.01E-02	-2.11E-02	1	1.88E-03	
	Oceania	6.13E-03	2.13E-02	-2.21E-02	-2.92E-02	5.14E-03	1.88E-03	1	
Industrial	Africa/Middle East	-9.64E-02	-1.08E-02	1.69E-03	-1.07E-02	-9.02E-03	-4.08E-03	1.02E-03	
	Southern Asia	2.88E-02	-4.72E-01	-4.81E-03	-4.21E-02	2.62E-02	1.13E-02	-2.13E-03	
	Central/South America	-4.37E-04	2.50E-03	-9.05E-03	-1.34E-04	8.18E-04	7.43E-04	-1.58E-03	
	Northern Asia	5.24E-03	-5.02E-02	2.04E-03	-1.30E-01	-5.51E-02	1.89E-01	-2.43E-03	
	Europe	-1.14E-02	3.32E-03	2.98E-03	-1.52E-02	-7.10E-01	-1.13E-02	9.05E-05	
	North America	8.37E-03	3.28E-02	3.06E-03	4.09E-02	2.93E-02	-3.82E-01	-6.28E-04	
	Oceania	4.61E-04	1.48E-03	-1.69E-03	-2.04E-03	3.37E-04	6.82E-05	-1.20E-02	
Natural Soil	Africa/Middle East	-1.92E-01	-1.38E-02	-9.76E-02	-3.14E-03	-8.90E-03	5.96E-03	3.40E-03	
	Southern Asia	-7.83E-02	-4.21E-01	1.45E-02	3.04E-02	-3.29E-02	-5.66E-02	2.25E-02	
	Central/South America	-4.81E-02	4.65E-02	2.81E-01	-2.43E-03	2.08E-02	2.34E-02	5.40E-02	
	Northern Asia	3.45E-02	-2.46E-02	-5.38E-03	-1.89E-01	2.96E-02	9.16E-02	-1.22E-02	
	Europe	-3.04E-02	-1.96E-02	4.78E-03	7.89E-05	-2.83E-01	2.91E-02	3.97E-03	
	North America	-2.62E-02	-2.66E-02	1.86E-02	7.03E-02	6.75E-03	-4.96E-01	5.65E-03	
	Oceania	2.45E-03	1.44E-02	-2.78E-02	-1.53E-02	6.88E-03	6.02E-03	-8.26E-02	
Ocean	North Pacific	-1.75E-02	-2.25E-01	7.49E-03	2.34E-02	5.92E-03	-2.90E-02	9.29E-03	
	South Pacific	-1.62E-02	-1.84E-02	-2.24E-02	2.81E-02	1.62E-02	9.28E-03	2.38E-02	
	Northern Ocean	3.96E-04	-2.46E-02	3.38E-03	-4.28E-02	-7.89E-02	-1.26E-02	4.77E-03	
	Atlantic	-8.43E-02	-1.46E-01	-2.73E-02	-2.66E-02	-6.11E-02	-1.01E-01	1.65E-02	
	Southern Ocean	1.85E-02	6.29E-02	-1.80E-01	-1.96E-02	6.64E-03	3.91E-03	-7.22E-02	
	Indian Ocean	-2.13E-02	3.77E-03	-1.13E-01	-1.25E-03	1.25E-02	1.52E-02	-4.17E-02	
Biomass burning	Africa/Middle East	-2.16E-02	-4.65E-03	-3.28E-02	7.59E-03	4.41E-03	2.43E-03	5.64E-03	
	Southern Asia	-1.18E-02	-8.19E-02	1.68E-03	1.89E-02	2.16E-03	-1.80E-03	2.99E-03	
	Central/South America	8.17E-04	2.98E-02	-3.10E-02	7.08E-04	6.87E-03	6.00E-03	5.12E-03	
	Northern Asia	-5.22E-04	-1.63E-02	5.07E-04	-1.20E-03	5.31E-04	4.29E-03	4.18E-04	
	Europe	-9.63E-04	1.02E-05	6.60E-05	-2.10E-04	7.55E-05	3.58E-04	5.59E-05	
	North America	-1.36E-03	-2.70E-03	6.40E-04	3.51E-03	3.27E-04	5.82E-03	5.01E-04	
	Oceania	1.39E-03	7.22E-03	-5.15E-03	-3.11E-03	2.32E-03	2.47E-03	-4.47E-03	

**Fig. S2bh.** Correlation of the emissions in 2007 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-9.64E-02	2.88E-02	-4.37E-04	5.24E-03	-1.14E-02	8.37E-03	4.61E-04
	Southern Asia	-1.08E-02	-4.72E-01	2.50E-03	-5.02E-02	3.32E-03	3.28E-02	1.48E-03
	Central/South America	1.69E-03	-4.81E-03	-9.05E-03	2.04E-03	2.98E-03	3.06E-03	-1.69E-03
	Northern Asia	-1.07E-02	-4.21E-02	-1.34E-04	-1.30E-01	-1.52E-02	4.09E-02	-2.04E-03
	Europe	-9.02E-03	2.62E-02	8.18E-04	-5.51E-02	-7.10E-01	2.93E-02	3.37E-04
	North America	-4.08E-03	1.13E-02	7.43E-04	1.89E-01	-1.13E-02	-3.82E-01	6.82E-05
Industrial	Oceania	1.02E-03	-2.13E-03	-1.58E-03	-2.43E-03	9.05E-05	-6.28E-04	-1.20E-02
	Africa/Middle East	1.402E-03	1.39E-04	-1.89E-03	-3.67E-03	1.73E-03	7.40E-05	
	Southern Asia	4.02E-03	1	-4.13E-04	-4.17E-02	3.12E-03	2.22E-02	-2.06E-04
	Central/South America	1.39E-04	-4.13E-04	1	2.32E-04	2.57E-04	2.78E-04	-1.21E-04
	Northern Asia	-1.89E-03	-4.17E-02	2.32E-04	1	-2.43E-02	-3.04E-01	-2.11E-04
	Europe	-3.67E-03	3.12E-03	2.57E-04	-2.43E-02	1	7.40E-03	-1.26E-05
Natural Soil	North America	1.73E-03	2.22E-02	2.78E-04	-3.04E-01	7.40E-03	1	-5.22E-05
	Oceania	7.40E-05	-2.06E-04	-1.21E-04	-2.11E-04	-1.26E-05	-5.22E-05	1
	Africa/Middle East	-3.15E-02	6.49E-02	-8.78E-03	3.74E-02	6.23E-04	1.20E-02	3.93E-04
	Southern Asia	-7.40E-03	-4.38E-02	1.44E-03	2.42E-02	-1.89E-02	-2.11E-02	2.25E-03
	Central/South America	1.68E-03	-5.59E-03	-2.37E-02	2.23E-02	6.25E-03	8.23E-03	-4.71E-03
	Northern Asia	7.25E-03	-1.40E-02	-6.02E-04	-5.67E-02	3.99E-02	2.60E-02	-1.10E-03
Ocean	Europe	-7.74E-03	1.37E-02	3.36E-04	1.22E-02	-2.13E-01	2.54E-02	3.34E-04
	North America	-4.03E-04	5.14E-02	1.30E-03	-1.75E-01	1.72E-02	-1.99E-01	4.73E-04
	Oceania	8.81E-04	-1.34E-03	-2.10E-03	5.18E-04	1.34E-03	1.10E-03	-6.04E-03
	North Pacific	-3.51E-03	-1.06E-02	6.46E-04	5.83E-02	-3.40E-03	-6.42E-02	7.20E-04
	South Pacific	5.85E-05	1.13E-02	-2.24E-03	1.97E-02	7.40E-03	-5.63E-04	2.68E-03
	Northern Ocean	-2.31E-04	-9.46E-03	3.94E-04	2.87E-02	1.96E-02	2.01E-02	3.64E-04
Biomass burning	Atlantic	-1.32E-02	-1.55E-03	-2.37E-03	-1.97E-01	-2.66E-02	-9.01E-02	1.27E-03
	Southern Ocean	2.13E-03	-2.52E-02	-1.24E-02	2.54E-03	-5.07E-04	8.89E-03	-5.59E-03
	Indian Ocean	-1.04E-04	1.82E-02	-8.97E-03	6.80E-03	4.69E-03	8.28E-05	-4.33E-03
	Africa/Middle East	1.18E-03	1.18E-02	2.87E-03	1.12E-02	2.82E-03	1.95E-03	4.65E-04
	Southern Asia	-2.02E-03	-2.99E-03	1.26E-04	9.78E-03	2.27E-03	8.64E-04	2.23E-04
	Central/South America	1.27E-03	3.83E-03	-2.59E-03	2.63E-03	2.14E-03	1.86E-03	5.13E-04

**Fig. S2bi.** Correlation of the emissions in 2007 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. S./ America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.92E-01	-7.83E-02	-4.81E-02	3.45E-02	-3.04E-02	-2.62E-02	2.45E-03
	Southern Asia	-1.38E-02	-4.21E-01	4.65E-02	-2.46E-02	-1.96E-02	-2.66E-02	1.44E-02
	Central/South America	-9.76E-02	1.45E-02	-2.81E-01	-5.38E-03	4.78E-03	1.86E-02	-2.78E-02
	Northern Asia	-3.14E-03	3.04E-02	-2.43E-03	-1.89E-01	7.89E-05	7.03E-02	-1.53E-02
	Europe	-8.90E-03	-3.29E-02	2.08E-02	2.96E-02	-2.83E-01	6.75E-03	6.88E-03
	North America	5.96E-03	-5.66E-02	2.34E-02	9.16E-02	2.91E-02	-4.96E-01	6.02E-03
Industrial	Oceania	3.40E-03	2.25E-02	-5.40E-02	-1.22E-02	3.97E-03	5.65E-03	-8.26E-02
	Africa/Middle East	-3.15E-02	-7.40E-03	1.68E-03	7.25E-03	-7.74E-03	-4.03E-04	8.81E-04
	Southern Asia	6.49E-02	-4.38E-02	-5.59E-03	-1.40E-02	1.37E-02	5.14E-02	-1.34E-03
	Central/South America	-8.78E-03	1.44E-03	-2.37E-02	-6.02E-04	3.36E-04	1.30E-03	-2.10E-03
	Northern Asia	3.74E-02	2.42E-02	2.23E-02	-5.67E-02	1.22E-02	-1.75E-01	5.18E-04
	Europe	6.23E-04	-1.89E-02	6.25E-03	3.99E-02	-2.13E-01	1.72E-02	1.34E-03
Natural Soil	North America	1.20E-02	-2.11E-02	8.23E-03	2.60E-02	2.54E-02	-1.99E-01	1.10E-03
	Oceania	3.93E-04	2.25E-03	-4.71E-03	-1.10E-03	3.34E-04	4.73E-04	-6.04E-03
	Africa/Middle East	1	-3.63E-01	-3.06E-01	1.15E-01	-2.98E-02	-8.71E-02	-7.73E-03
	Southern Asia	-3.63E-01	1	-8.63E-03	-3.66E-01	5.92E-02	-8.61E-03	7.01E-03
	Central/South America	-3.06E-01	-8.63E-03	1	-6.93E-02	3.39E-03	-2.91E-02	-9.45E-02
	Northern Asia	1.15E-01	-3.66E-01	-6.93E-02	1	-1.73E-01	-2.39E-01	-1.52E-02
Ocean	Europe	-2.98E-02	5.92E-02	3.39E-03	-1.73E-01	1	-1.20E-01	4.37E-04
	North America	-8.71E-02	-8.61E-03	-2.91E-02	-2.39E-01	-1.20E-01	1	6.40E-03
	Oceania	-7.73E-03	7.01E-03	9.45E-02	-1.52E-02	4.37E-04	6.40E-03	1
	North Pacific	4.63E-02	1.91E-01	2.27E-02	-2.34E-01	2.47E-02	4.08E-02	2.82E-03
	South Pacific	-4.13E-02	6.67E-03	-4.99E-01	-1.00E-02	1.09E-03	4.79E-02	9.45E-03
	Northern Ocean	2.85E-02	1.29E-01	4.69E-02	-8.73E-02	-1.98E-02	-2.23E-03	2.30E-03
Biomass burning	Atlantic	-1.22E-01	1.61E-01	-1.52E-02	2.69E-02	4.58E-02	5.85E-02	1.14E-03
	Southern Ocean	6.49E-02	2.02E-01	-3.75E-04	-5.95E-02	8.62E-03	2.23E-02	-3.66E-02
	Indian Ocean	-1.09E-01	-1.80E-01	-1.87E-01	4.13E-02	4.47E-03	3.90E-02	-5.51E-02
	Africa/Middle East	1.20E-01	-5.58E-02	2.17E-02	3.02E-02	1.56E-03	3.15E-03	-5.98E-04
	Southern Asia	1.21E-02	5.41E-02	-1.22E-02	-1.73E-02	-1.16E-02	-6.68E-03	-2.47E-03
	Central/South America	-8.02E-02	-4.04E-02	5.09E-02	2.49E-02	5.63E-03	2.58E-02	-9.52E-04
Biomass burning	Northern Asia	-4.16E-04	1.11E-03	2.69E-04	-4.06E-02	-1.09E-02	-2.06E-02	6.92E-05
	Europe	-5.63E-04	3.96E-04	1.46E-04	-1.13E-03	-4.95E-03	-1.38E-03	2.59E-05
	North America	-1.34E-03	4.30E-03	-1.40E-03	-1.86E-02	-9.94E-03	-3.77E-02	1.62E-04
	Oceania	-7.37E-03	-1.21E-02	3.96E-03	3.16E-03	8.78E-04	4.64E-03	-6.19E-03

**Fig. S2bj.** Correlation of the emissions in 2007 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-1.75E-02	-1.62E-02	3.96E-04	-8.43E-02	1.85E-02	-2.13E-02
	Southern Asia	-2.25E-01	-1.84E-02	-2.46E-02	-1.46E-01	6.29E-02	3.77E-03
	Central/South America	7.49E-03	-2.24E-02	3.38E-03	-2.73E-02	-1.80E-01	-1.13E-01
	Northern Asia	2.34E-02	2.81E-02	-4.28E-02	-2.66E-02	-1.96E-02	-1.25E-03
	Europe	5.92E-03	1.62E-02	-7.89E-02	-6.11E-02	6.64E-03	1.25E-02
	North America	-2.90E-02	9.28E-03	-1.26E-02	-1.01E-01	3.91E-03	1.52E-02
Industrial	Oceania	9.29E-03	2.38E-02	4.77E-03	1.65E-02	-7.22E-02	-4.17E-02
	Africa/Middle East	-3.51E-03	5.85E-05	-2.31E-04	-1.32E-02	2.13E-03	-1.04E-04
	Southern Asia	-1.06E-02	1.13E-02	-9.46E-03	-1.55E-03	-2.52E-02	1.82E-02
	Central/South America	6.46E-04	-2.24E-03	3.94E-04	-2.37E-03	-1.24E-02	-8.97E-03
	Northern Asia	5.83E-02	1.97E-02	2.87E-02	-1.97E-01	2.54E-03	6.80E-03
	Europe	-3.40E-03	7.40E-03	1.96E-02	-2.66E-02	-5.07E-04	4.69E-03
Natural Soil	North America	-6.42E-02	-5.63E-04	2.01E-02	-9.01E-02	8.89E-03	8.28E-05
	Oceania	7.20E-04	2.68E-03	3.64E-04	1.27E-03	-5.59E-03	-4.33E-03
	Africa/Middle East	4.63E-02	-4.13E-02	2.85E-02	-1.22E-01	6.49E-02	-1.09E-01
	Southern Asia	1.91E-01	6.67E-03	1.29E-01	1.61E-01	2.02E-01	-1.80E-01
	Central/South America	2.27E-02	-4.99E-01	4.69E-02	-1.52E-02	-3.75E-04	-1.87E-01
	Northern Asia	-2.34E-01	-1.00E-02	-8.73E-02	2.69E-02	-5.95E-02	4.13E-02
Ocean	Europe	2.47E-02	1.09E-03	-1.98E-02	4.58E-02	8.62E-03	4.47E-03
	North America	4.08E-02	4.79E-02	-2.23E-03	5.85E-02	2.23E-02	3.90E-02
	Oceania	2.82E-03	9.45E-03	2.30E-03	1.14E-03	-3.66E-02	-5.51E-02
	North Pacific	1	-2.54E-03	-7.22E-02	-1.87E-01	3.04E-02	1.85E-02
	South Pacific	-2.54E-03	1	1.13E-02	-6.63E-02	5.11E-02	5.39E-03
	Northern Ocean	-7.22E-02	1.13E-02	1	-3.36E-01	3.43E-02	-1.55E-04
Biomass burning	Atlantic	-1.87E-01	-6.63E-02	-3.36E-01	1	-6.10E-02	-4.86E-02
	Southern Ocean	3.04E-02	5.11E-02	3.43E-02	-6.10E-02	1	-6.42E-01
	Indian Ocean	1.85E-02	5.39E-03	-1.55E-04	-4.86E-02	-6.42E-01	1
	Africa/Middle East	6.49E-03	-4.92E-02	1.23E-03	-5.40E-02	2.13E-03	-4.75E-02
	Southern Asia	-2.35E-02	-2.56E-02	-4.00E-03	-3.26E-02	2.10E-02	-1.80E-02
	Central/South America	7.08E-04	-8.64E-02	-6.06E-03	-4.13E-02	-6.07E-02	-5.55E-02

**Fig. S2bk.** Correlation of the emissions in 2007 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.16E-02	-1.18E-02	8.17E-04	-5.22E-04	-9.63E-04	-1.36E-03	1.39E-03
	Southern Asia	-4.65E-03	-8.19E-02	2.98E-02	-1.63E-02	1.02E-05	-2.70E-03	7.22E-03
	Central/South America	-3.28E-02	1.68E-03	-3.10E-02	5.07E-04	6.60E-05	6.40E-04	-5.15E-03
	Northern Asia	7.59E-03	1.89E-02	7.08E-04	-1.20E-03	-2.10E-04	3.51E-03	-3.11E-03
	Europe	4.41E-03	2.16E-03	6.87E-03	5.31E-04	7.55E-05	3.27E-04	2.32E-03
	North America	2.43E-03	-1.80E-03	6.00E-03	4.29E-03	3.58E-04	5.82E-03	2.47E-03
Industrial	Oceania	5.64E-03	2.99E-03	5.12E-03	4.18E-04	5.59E-05	5.01E-04	-4.47E-03
	Africa/Middle East	-1.18E-03	-2.02E-03	1.27E-03	-8.50E-05	-2.16E-04	-1.08E-04	4.23E-04
	Southern Asia	1.18E-02	-2.99E-03	3.83E-03	-2.24E-03	1.16E-04	2.13E-03	1.06E-03
	Central/South America	-2.87E-03	1.26E-04	-2.59E-03	3.23E-05	5.49E-06	4.59E-05	-4.07E-04
	Northern Asia	1.12E-02	9.78E-03	2.63E-03	2.77E-03	1.50E-04	3.25E-04	3.34E-04
	Europe	2.82E-03	2.27E-03	2.14E-03	1.27E-03	4.54E-05	1.15E-03	5.74E-04
Natural Soil	North America	1.95E-03	8.64E-04	1.86E-03	3.48E-03	2.88E-04	-1.46E-03	3.62E-04
	Oceania	4.65E-04	2.23E-04	5.13E-04	4.67E-05	5.02E-06	4.05E-05	-4.75E-04
	Africa/Middle East	-1.20E-01	1.21E-02	-8.02E-02	-4.16E-04	-5.63E-04	-1.34E-03	-7.37E-03
	Southern Asia	-5.58E-02	5.41E-02	-4.04E-02	1.11E-03	3.96E-04	4.30E-03	-1.21E-02
	Central/South America	-2.17E-02	-1.22E-02	5.09E-02	2.69E-04	1.46E-04	-1.40E-03	3.96E-03
	Northern Asia	3.02E-02	-1.73E-02	2.49E-02	-4.06E-02	-1.13E-03	-1.86E-02	3.16E-03
Ocean	Europe	1.56E-03	-1.16E-02	5.63E-03	-1.09E-02	-4.95E-03	-9.94E-03	8.78E-04
	North America	3.15E-03	-6.68E-03	2.58E-02	-2.06E-02	-1.38E-03	-3.77E-02	4.64E-03
	Oceania	-5.98E-04	-2.47E-03	9.52E-04	6.92E-05	2.59E-05	1.62E-04	-6.19E-03
	North Pacific	6.49E-03	-2.35E-02	7.08E-04	-1.62E-02	3.54E-04	-3.46E-03	8.62E-04
	South Pacific	-4.92E-02	-2.56E-02	-8.64E-02	2.09E-03	6.45E-05	-8.42E-05	-3.58E-03
	Northern Ocean	1.23E-03	-4.00E-03	-6.06E-03	-1.08E-03	-2.20E-04	-5.07E-03	-1.22E-03
Biomass burning	Atlantic	-5.40E-02	-3.26E-02	-4.13E-02	6.95E-03	-1.34E-05	1.08E-04	-4.30E-03
	Southern Ocean	2.13E-03	2.10E-02	-6.07E-02	8.83E-04	1.38E-04	1.57E-03	-4.89E-04
	Indian Ocean	-4.75E-02	-1.80E-02	-5.55E-02	-6.18E-04	1.08E-04	7.97E-04	-1.54E-02
	Africa/Middle East	1	-9.07E-04	4.12E-02	9.23E-04	-3.46E-05	5.40E-04	-4.05E-03
	Southern Asia	-9.07E-04	1	5.91E-03	3.59E-04	-4.23E-05	-7.22E-04	8.25E-04
	Central/South America	-4.12E-02	5.91E-03	1	7.11E-05	-4.32E-05	5.65E-04	-8.01E-03

**Fig. S2bl.** Correlation of the emissions in 2007 for biomass burning.

		Agricultural Soil						
Source sector	Region	Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	1 -6.79E-02	-3.61E-03	-2.86E-02	-2.53E-02	-1.71E-02	6.92E-03	
	Southern Asia	-6.79E-02	1	3.29E-02	-2.43E-01	3.79E-02	-6.53E-02	2.34E-02
	Central/South America	-3.61E-03	3.29E-02	1	-8.22E-03	7.53E-03	5.11E-03	-2.44E-02
	Northern Asia	-2.86E-02	-2.43E-01	-8.22E-03	1	-1.67E-01	-5.24E-02	-2.58E-02
	Europe	-2.53E-02	3.79E-02	7.53E-03	-1.67E-01	1	-2.21E-02	5.45E-03
	North America	-1.71E-02	-6.53E-02	5.11E-03	-5.24E-02	-2.21E-02	1	3.65E-03
	Oceania	6.92E-03	2.34E-02	-2.44E-02	2.58E-02	5.45E-03	3.65E-03	1
Industrial	Africa/Middle East	-9.01E-02	-9.16E-03	1.32E-03	-9.01E-03	-1.09E-02	-3.13E-03	1.21E-03
	Southern Asia	2.21E-02	-4.46E-01	-2.04E-03	-4.26E-02	2.19E-02	9.86E-03	-1.69E-03
	Central/South America	-3.39E-04	3.07E-03	8.69E-03	-6.44E-04	7.16E-04	5.26E-04	-1.92E-03
	Northern Asia	2.95E-03	-4.05E-02	1.07E-03	-1.51E-01	-6.41E-02	1.43E-01	-6.24E-04
	Europe	-1.85E-02	3.28E-03	2.90E-03	-3.16E-02	-7.18E-01	-1.07E-02	1.64E-04
	North America	8.20E-03	2.29E-02	3.18E-03	3.89E-02	3.05E-02	-4.22E-01	-2.98E-04
	Oceania	5.89E-04	1.70E-03	-2.07E-03	-1.80E-03	3.69E-04	2.68E-04	-1.02E-02
Natural Soil	Africa/Middle East	-1.83E-01	-2.09E-02	-8.04E-02	4.84E-03	-1.38E-02	-2.48E-03	-3.49E-03
	Southern Asia	-7.17E-02	-4.16E-01	9.36E-03	1.85E-02	-1.44E-02	-3.92E-02	1.89E-02
	Central/South America	6.88E-02	3.15E-03	2.65E-01	1.97E-02	2.73E-02	1.18E-02	-3.12E-02
	Northern Asia	1.45E-02	-1.02E-01	-5.54E-03	-1.85E-01	2.21E-03	1.08E-01	-1.61E-02
	Europe	-2.88E-02	-5.50E-03	7.84E-03	1.12E-02	-2.52E-01	1.60E-02	5.43E-03
	North America	-2.49E-02	-1.95E-02	1.80E-02	9.43E-02	2.49E-03	-4.21E-01	7.75E-03
	Oceania	3.53E-03	1.69E-02	-2.50E-02	-1.47E-02	6.05E-03	5.31E-03	-6.49E-02
Ocean	North Pacific	-1.34E-02	-1.89E-01	1.10E-02	1.85E-02	2.39E-03	-4.51E-02	8.57E-03
	South Pacific	-2.08E-03	1.51E-02	-3.13E-02	9.24E-03	1.33E-02	1.38E-02	3.32E-03
	Northern Ocean	2.23E-03	-3.66E-02	6.80E-03	-5.15E-02	-7.98E-02	-2.41E-02	7.44E-03
	Atlantic	-8.03E-02	-1.46E-01	-1.49E-02	-2.05E-02	-5.48E-02	-9.25E-02	1.38E-02
	Southern Ocean	2.58E-02	6.16E-02	-1.88E-01	-2.66E-02	6.17E-03	6.81E-03	-9.68E-02
	Indian Ocean	-3.33E-02	1.51E-02	-9.79E-02	-3.06E-03	9.41E-03	1.52E-02	-3.51E-02
Biomass burning	Africa/Middle East	-2.64E-02	-1.02E-02	-2.16E-02	2.96E-03	9.66E-05	-5.04E-03	4.42E-03
	Southern Asia	-3.05E-03	-3.10E-02	8.55E-04	4.97E-03	1.38E-03	-1.03E-04	9.62E-04
	Central/South America	-2.24E-03	7.99E-03	-7.73E-03	-2.43E-04	1.00E-03	7.07E-04	1.68E-03
	Northern Asia	-1.86E-03	-6.19E-02	2.04E-03	-1.64E-02	1.06E-02	1.26E-02	2.12E-03
	Europe	-2.50E-04	2.85E-04	1.04E-05	8.93E-05	-9.95E-05	2.19E-04	2.84E-06
	North America	-1.65E-03	-4.55E-03	1.99E-03	1.33E-02	7.16E-04	1.62E-02	1.76E-03
	Oceania	2.96E-04	2.81E-03	-2.13E-03	-1.85E-03	7.68E-04	6.46E-04	-2.37E-03

**Fig. S2bm.** Correlation of the emissions in 2008 for agricultural soil.

Source sector	Region	Industrial						
		Africa/M. East	Southern Asia	C. /S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-9.01E-02	2.21E-02	-3.39E-04	2.95E-03	-1.85E-02	8.20E-03	5.89E-04
	Southern Asia	-9.16E-03	-4.46E-01	3.07E-03	-4.05E-02	3.28E-03	2.29E-02	1.70E-03
	Central/South America	1.32E-03	-2.04E-03	-8.69E-03	1.07E-03	2.90E-03	3.18E-03	-2.07E-03
	Northern Asia	-9.01E-03	-4.26E-02	-6.44E-04	-1.51E-01	-3.16E-02	3.89E-02	-1.80E-03
	Europe	-1.09E-02	2.19E-02	7.16E-04	-6.41E-02	-7.18E-01	3.05E-02	3.69E-04
	North America	-3.13E-03	9.86E-03	5.26E-04	1.43E-01	-1.07E-02	-4.22E-01	2.68E-04
Industrial	Oceania	1.21E-03	-1.69E-03	-1.92E-03	-6.24E-04	1.64E-04	-2.98E-04	-1.02E-02
	Africa/Middle East	1	3.23E-03	1.36E-04	-4.08E-03	8.67E-03	1.95E-03	9.91E-05
	Southern Asia	3.23E-03	1	-2.46E-04	-3.74E-02	4.73E-03	1.55E-02	-1.97E-04
	Central/South America	1.36E-04	-2.46E-04	1	1.39E-04	2.98E-04	3.63E-04	-1.60E-04
	Northern Asia	-4.08E-03	-3.74E-02	1.39E-04	1	-2.71E-02	-2.46E-01	-1.27E-04
	Europe	-8.67E-03	4.73E-03	2.98E-04	-2.71E-02	1	9.36E-03	-4.37E-06
Natural Soil	North America	1.95E-03	1.55E-02	3.63E-04	-2.46E-01	9.36E-03	1	-1.04E-05
	Oceania	9.91E-05	-1.97E-04	-1.60E-04	-1.27E-04	-4.37E-06	-1.04E-05	1
	Africa/Middle East	-3.30E-02	3.94E-02	-8.54E-03	2.86E-02	-4.66E-03	1.05E-02	-1.64E-04
	Southern Asia	-8.31E-03	-5.88E-02	1.07E-03	2.33E-02	-2.65E-02	-1.30E-02	1.98E-03
	Central/South America	-2.26E-03	1.06E-02	-2.30E-02	4.33E-02	1.26E-02	6.82E-03	-3.52E-03
	Northern Asia	6.93E-03	-1.33E-02	-3.17E-04	-6.54E-02	4.32E-02	3.39E-02	-1.19E-03
Ocean	Europe	-6.65E-03	1.42E-02	6.47E-04	6.06E-03	-1.99E-01	2.41E-02	4.45E-04
	North America	-7.49E-04	5.00E-02	1.39E-03	-1.39E-01	6.10E-03	-2.06E-01	6.41E-04
	Oceania	9.59E-04	-4.51E-04	-2.00E-03	8.12E-04	1.29E-03	7.91E-04	-4.43E-03
	North Pacific	-3.94E-03	-1.40E-02	1.02E-03	4.06E-02	-1.47E-02	-4.48E-02	6.36E-04
	South Pacific	4.45E-04	7.42E-03	-2.47E-03	9.48E-03	7.07E-03	3.25E-04	1.76E-03
	Northern Ocean	1.81E-03	-2.65E-03	6.85E-04	2.20E-02	1.03E-03	2.53E-02	5.40E-04
Biomass burning	Atlantic	-1.09E-02	1.67E-03	-1.59E-03	-1.98E-01	-3.08E-02	-1.20E-01	1.15E-03
	Southern Ocean	3.25E-03	-2.24E-02	-1.23E-02	-1.16E-03	-2.21E-03	9.86E-03	-7.18E-03
	Indian Ocean	-1.67E-03	1.73E-03	-8.00E-03	6.94E-03	6.20E-03	1.47E-03	-3.90E-03
	Africa/Middle East	2.91E-03	9.24E-03	2.29E-03	9.75E-03	1.89E-03	1.27E-03	4.31E-04
	Southern Asia	-5.27E-04	-3.75E-03	8.65E-05	2.33E-03	1.11E-03	8.24E-06	8.09E-05
	Central/South America	-3.53E-05	1.87E-03	-7.66E-04	8.16E-04	9.05E-04	2.67E-04	1.63E-04

**Fig. S2bn.** Correlation of the emissions in 2008 for industrial.

Source sector	Region	Natural Soil						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-1.83E-01	-7.17E-02	-6.88E-02	1.45E-02	-2.88E-02	-2.49E-02	3.53E-03
	Southern Asia	-2.09E-02	-4.16E-01	3.15E-03	-1.02E-01	-5.50E-03	-1.95E-02	1.69E-02
	Central/South America	-8.04E-02	9.36E-03	-2.65E-01	-5.54E-03	7.84E-03	1.80E-02	-2.50E-02
	Northern Asia	4.84E-03	1.85E-02	1.97E-02	-1.85E-01	1.12E-02	9.43E-02	-1.47E-02
	Europe	-1.38E-02	-1.44E-02	2.73E-02	2.21E-03	-2.52E-01	2.49E-03	6.05E-03
	North America	-2.48E-03	-3.92E-02	1.18E-02	1.08E-01	1.60E-02	-4.21E-01	5.31E-03
Industrial	Oceania	-3.49E-03	1.89E-02	-3.12E-02	-1.61E-02	5.43E-03	7.75E-03	-6.49E-02
	Africa/Middle East	-3.30E-02	-8.31E-03	-2.26E-03	6.93E-03	-6.65E-03	-7.49E-04	9.59E-04
	Southern Asia	3.94E-02	-5.88E-02	1.06E-02	-1.33E-02	1.42E-02	5.00E-02	-4.51E-04
	Central/South America	-8.54E-03	1.07E-03	-2.30E-02	-3.17E-04	6.47E-04	1.39E-03	-2.00E-03
	Northern Asia	2.86E-02	2.33E-02	4.33E-02	-6.54E-02	6.06E-03	-1.39E-01	8.12E-04
	Europe	-4.66E-03	-2.65E-02	1.26E-02	4.32E-02	-1.99E-01	6.10E-03	1.29E-03
Natural Soil	North America	1.05E-02	-1.30E-02	6.82E-03	3.39E-02	2.41E-02	-2.06E-01	7.91E-04
	Oceania	-1.64E-04	1.98E-03	-3.52E-03	-1.19E-03	4.45E-04	6.41E-04	-4.43E-03
	Africa/Middle East	1	-2.44E-01	-3.65E-01	3.64E-02	-2.97E-02	-7.47E-02	-1.09E-02
	Southern Asia	-2.44E-01	1	-3.03E-02	-3.27E-01	6.34E-02	1.10E-04	4.43E-03
	Central/South America	-3.65E-01	-3.03E-02	1	-1.05E-01	2.62E-03	-1.97E-02	-8.49E-02
	Northern Asia	3.64E-02	-3.27E-01	-1.05E-01	1	-1.99E-01	-3.37E-01	-1.89E-02
Ocean	Europe	-2.97E-02	6.34E-02	2.62E-03	-1.99E-01	1	-7.40E-02	3.62E-03
	North America	-7.47E-02	1.10E-04	-1.97E-02	-3.37E-01	-7.40E-02	1	9.99E-03
	Oceania	-1.09E-02	4.43E-03	-8.49E-02	-1.89E-02	3.62E-03	9.99E-03	1
	North Pacific	4.45E-02	1.80E-01	2.78E-02	-1.86E-01	6.07E-02	1.01E-01	5.81E-03
	South Pacific	1.43E-02	7.21E-04	-5.06E-01	-1.66E-02	1.00E-02	5.30E-02	1.78E-03
	Northern Ocean	4.37E-02	1.46E-01	4.25E-02	-9.90E-02	2.16E-04	3.84E-03	4.94E-03
Biomass burning	Atlantic	-9.80E-02	1.66E-01	-7.40E-02	1.75E-02	3.29E-02	5.95E-02	3.32E-03
	Southern Ocean	6.48E-02	1.91E-01	-1.29E-02	-4.15E-02	1.60E-02	3.08E-02	-4.73E-02
	Indian Ocean	-9.64E-02	-1.65E-01	-1.98E-01	2.65E-02	9.66E-03	4.32E-02	-4.37E-02
	Africa/Middle East	-8.00E-02	-4.78E-02	2.97E-02	2.52E-02	7.41E-04	1.78E-03	6.78E-04
	Southern Asia	1.80E-03	1.97E-02	-8.39E-03	-8.33E-03	-2.72E-03	9.95E-04	-8.34E-04
	Central/South America	-1.69E-02	-1.43E-02	-2.11E-03	8.93E-03	1.71E-03	7.25E-03	2.07E-04

**Fig. S2bo.** Correlation of the emissions in 2008 for natural soil.

Source sector	Region	Ocean					
		North Pacific	South Pacific	Northern Ocean	Atlantic	Southern Ocean	Indian Ocean
Agricultural Soil	Africa/Middle East	-1.34E-02	-2.08E-03	2.23E-03	-8.03E-02	2.58E-02	-3.33E-02
	Southern Asia	-1.89E-01	1.51E-02	-3.66E-02	-1.46E-01	6.16E-02	1.51E-02
	Central/South America	1.10E-02	-3.13E-02	6.80E-03	-1.49E-02	-1.88E-01	-9.79E-02
	Northern Asia	1.85E-02	9.24E-03	-5.15E-02	-2.05E-02	-2.66E-02	-3.06E-03
	Europe	2.39E-03	1.33E-02	-7.98E-02	-5.48E-02	6.17E-03	9.41E-03
	North America	-4.51E-02	1.38E-02	-2.41E-02	-9.25E-02	6.81E-03	1.52E-02
Industrial	Oceania	8.57E-03	3.32E-03	7.44E-03	1.38E-02	-9.68E-02	-3.51E-02
	Africa/Middle East	-3.94E-03	4.45E-04	1.81E-03	-1.09E-02	3.25E-03	-1.67E-03
	Southern Asia	-1.40E-02	7.42E-03	-2.65E-03	1.67E-03	-2.24E-02	1.73E-02
	Central/South America	1.02E-03	-2.47E-03	6.85E-04	-1.59E-03	-1.23E-02	-8.00E-03
	Northern Asia	4.06E-02	9.48E-03	2.20E-02	-1.98E-01	-1.16E-03	6.94E-03
	Europe	-1.47E-02	7.07E-03	1.03E-03	-3.08E-02	-2.21E-03	6.20E-03
Natural Soil	North America	-4.48E-02	3.25E-04	2.53E-02	-1.20E-01	9.86E-03	1.47E-03
	Oceania	6.36E-04	1.76E-03	5.40E-04	1.15E-03	-7.18E-03	-3.90E-03
	Africa/Middle East	4.45E-02	1.43E-02	4.37E-02	-9.80E-02	6.48E-02	-9.64E-02
	Southern Asia	1.80E-01	7.21E-04	1.46E-01	1.66E-01	1.91E-01	-1.65E-01
	Central/South America	2.78E-02	-5.06E-01	4.25E-02	-7.40E-02	-1.29E-02	-1.98E-01
	Northern Asia	-1.86E-01	-1.66E-02	-9.90E-02	1.75E-02	-4.15E-02	2.65E-02
Ocean	Europe	6.07E-02	1.00E-02	2.16E-04	3.29E-02	1.60E-02	9.66E-03
	North America	1.01E-01	5.30E-02	3.84E-03	5.95E-02	3.08E-02	4.32E-02
	Oceania	5.81E-03	1.78E-03	4.94E-03	3.32E-03	-4.73E-02	-4.37E-02
	North Pacific	1	3.81E-03	-7.00E-02	-1.60E-01	2.93E-02	1.78E-02
	South Pacific	3.81E-03	1	5.09E-03	-3.33E-02	1.75E-02	1.84E-02
	Northern Ocean	-7.00E-02	5.09E-03	1	-2.97E-01	3.47E-02	-1.06E-03
Biomass burning	Atlantic	-1.60E-01	-3.33E-02	-2.97E-01	1	-3.92E-02	-3.95E-02
	Southern Ocean	2.93E-02	1.75E-02	3.47E-02	-3.92E-02	1	-6.12E-01
	Indian Ocean	1.78E-02	1.84E-02	-1.06E-03	-3.95E-02	-6.12E-01	1
	Africa/Middle East	-1.26E-03	-4.47E-02	2.01E-03	-5.22E-02	5.51E-03	-5.36E-02
	Southern Asia	-7.23E-03	-3.37E-03	-1.74E-03	-9.21E-03	7.10E-03	-4.74E-03
	Central/South America	-5.59E-04	-2.93E-02	-2.33E-03	-1.09E-02	-7.86E-03	-1.74E-02

**Fig. S2bp.** Correlation of the emissions in 2008 for ocean.

Source sector	Region	Biomass burning						
		Africa/M. East	Southern Asia	C. / S. America	Northern Asia	Europe	North America	Oceania
Agricultural Soil	Africa/Middle East	-2.64E-02	-3.05E-03	-2.24E-03	-1.86E-03	-2.50E-04	-1.65E-03	2.96E-04
	Southern Asia	-1.02E-02	-3.10E-02	7.99E-03	-6.19E-02	2.85E-04	-4.55E-03	2.81E-03
	Central/South America	-2.16E-02	8.55E-04	-7.73E-03	2.04E-03	1.04E-05	1.99E-03	-2.13E-03
	Northern Asia	2.96E-03	4.97E-03	-2.43E-04	-1.64E-02	8.93E-05	1.33E-02	-1.85E-03
	Europe	9.66E-05	1.38E-03	1.00E-03	1.06E-02	-9.95E-05	7.16E-04	7.68E-04
	North America	-5.04E-03	-1.03E-04	7.07E-04	1.26E-02	2.19E-04	1.62E-02	6.46E-04
Industrial	Oceania	4.42E-03	9.62E-04	1.68E-03	1.21E-03	2.84E-06	1.76E-03	-2.37E-03
	Africa/Middle East	-2.91E-03	-5.27E-04	-3.53E-05	-4.76E-04	-2.13E-05	-1.20E-05	1.12E-04
	Southern Asia	9.24E-03	-3.75E-03	1.87E-03	-3.20E-02	1.55E-04	4.17E-03	5.50E-04
	Central/South America	-2.29E-03	8.65E-05	-7.66E-04	1.53E-04	5.37E-07	1.37E-04	-1.76E-04
	Northern Asia	9.75E-03	2.33E-03	8.16E-04	-3.31E-03	-2.20E-04	1.95E-02	1.88E-04
	Europe	1.89E-03	1.11E-03	9.05E-04	5.31E-03	4.69E-04	3.10E-03	2.47E-04
Natural Soil	North America	1.27E-03	8.24E-06	2.67E-04	1.47E-02	2.06E-04	-9.73E-03	7.18E-05
	Oceania	4.31E-04	8.09E-05	1.63E-04	1.57E-04	3.24E-07	1.50E-04	-1.83E-04
	Africa/Middle East	-8.00E-02	1.80E-03	-1.69E-02	5.20E-03	-1.61E-04	-6.20E-04	-1.51E-03
	Southern Asia	-4.78E-02	1.97E-02	-1.43E-02	6.67E-02	-5.14E-04	3.40E-02	-5.08E-03
	Central/South America	-2.97E-02	-8.39E-03	-2.11E-03	5.87E-03	1.20E-04	-2.45E-03	-5.16E-03
	Northern Asia	2.52E-02	-8.33E-03	8.93E-03	-1.00E-01	-1.13E-03	-7.60E-02	-7.83E-06
Ocean	Europe	7.41E-04	-2.72E-03	1.71E-03	-1.68E-02	-5.81E-03	-1.77E-02	6.02E-04
	North America	1.78E-03	9.95E-04	7.25E-03	-3.57E-02	-7.88E-04	-1.09E-01	2.12E-03
	Oceania	6.78E-04	-8.34E-04	2.07E-04	1.13E-03	1.50E-05	4.49E-04	-3.21E-03
	North Pacific	-1.26E-03	-7.23E-03	-5.59E-04	-1.94E-01	6.52E-04	-1.48E-02	3.21E-04
	South Pacific	-4.47E-02	-3.37E-03	-2.93E-02	5.64E-03	1.27E-04	3.43E-03	-9.88E-04
	Northern Ocean	-2.01E-03	-1.74E-03	-2.33E-03	-1.65E-02	4.96E-04	-1.59E-02	-1.77E-04
Biomass burning	Atlantic	-5.22E-02	-9.21E-03	-1.09E-02	-6.42E-03	8.50E-04	1.04E-02	-9.89E-04
	Southern Ocean	-5.51E-03	7.10E-03	-7.86E-03	3.67E-03	-5.26E-05	6.57E-03	7.22E-04
	Indian Ocean	-5.36E-02	-4.74E-03	-1.74E-02	7.47E-03	8.79E-05	1.17E-03	-6.95E-03
	Africa/Middle East	1	-9.07E-04	1.41E-02	5.66E-04	2.12E-05	1.89E-03	-1.16E-03
	Southern Asia	-9.07E-04	1	4.76E-04	-3.85E-03	4.05E-05	-5.54E-04	-1.50E-04
	Central/South America	-1.41E-02	4.76E-04	1	-2.33E-04	2.62E-05	3.93E-04	-7.06E-04

**Fig. S2bq.** Correlation of the emissions in 2008 for biomass burning.

**Table S1a.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
HAT	9.24	2.72
OCI	11.38	7.83
BRW	17.86	6.49
MLO	19.96	4.31
NWR	31.18	11.87
SMO	18.28	3.33
SPO	16.56	4.16
SUM	11.42	1.34
ALT	18.55	6.36
ASC	15.02	0.99
ASK	18.69	2.70
AZR	16.43	1.91
BAL	15.05	3.82
BHD	2.77	2.69
BME	17.10	2.36
BSC	17.05	4.34
CBA	16.58	2.21
CGO	17.89	2.60
CHR	14.11	2.10
CMO	5.69	1.19
CRZ	11.54	3.18
DRP2	12.92	2.65
EIC	14.27	1.37
GMI	17.36	1.81
GOZ	7.38	1.86
HBA	12.77	5.22
HSU	26.11	5.97
HUN	18.29	4.74
ICE1	15.45	2.30
ITN	12.15	3.24
IZO	19.11	3.45
KEY	16.48	2.43
KUM	17.86	4.35
KZD1	16.03	2.19
KZM	17.33	3.03
LEF2	13.85	3.97

**Table S1b.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
MBC	4.11	0.66
MHD	22.56	3.33
MID	16.10	1.69
MVY	10.30	6.29
NWR	18.85	6.67
POC0003	2.82	0.23
POC0005	4.52	0.93
POC0007	3.92	0.41
POC0008	3.89	0.71
POC0009	3.20	0.86
POC00010	8.59	1.35
POC00013	2.77	0.15
POC00014	4.04	0.50
POC00015	3.91	0.43
POC00016	7.11	1.14
POC00017	2.68	0.13
POC00019	7.18	2.03
POC00020	4.67	1.17
POCN053	2.92	0.33
POCN054	4.78	0.58
POCN056	8.23	1.51
POCN057	9.99	1.43
POCN058	2.89	0.55
POCN0512	5.69	0.70
POCN0513	7.82	1.31
POCN0514	6.85	1.06
POCN0515	2.47	0.15
POCN102	2.78	0.18
POCN103	5.54	0.52
POCN107	3.04	0.59
POCN108	7.19	1.51
POCN109	8.70	1.09
POCN102	4.27	0.63
POCN104	8.20	1.43
POCN105	7.49	1.31
POCN106	4.02	0.53

**Table S1c.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
POCN153	2.44	0.16
POCN154	4.91	0.35
POCN158	6.77	1.08
POCN159	8.73	2.25
POCN1510	3.40	0.57
POCN1512	2.08	0.15
POCN1515	8.95	1.43
POCN1518	3.79	0.29
POCN202	4.65	0.67
POCN207	6.43	1.00
POCN208	6.37	1.55
POCN209	3.02	2.73
POCN2010	2.12	0.16
POCN2012	8.22	1.34
POCN2013	7.26	1.18
POCN2015	2.56	0.04
POCN252	2.86	0.26
POCN253	2.97	0.56
POCN255	3.44	0.68
POCN257	3.34	0.83
POCN258	5.86	0.71
POCN2510	7.29	1.27
POCN2511	6.70	1.10
POCN2512	3.67	0.76
POCN2513	3.96	0.69
POCN2514	7.48	1.08
POCN2515	2.64	0.02
POCN304	3.09	0.47
POCN305	2.16	0.45
POCN307	6.69	1.24
POCN3010	5.94	0.70
POCN3012	7.89	1.18
POCN3013	2.46	0.82
POCN3014	7.29	0.89
POCN352	1.51	0.70
POCN353	3.36	0.55

**Table S1d.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
POCN354	5.03	0.55
POCN355	7.10	0.75
POCS051	2.91	0.54
POCS052	2.85	0.22
POCS054	3.08	0.51
POCS055	4.27	0.71
POCS056	2.73	0.25
POCS057	7.56	0.88
POCS058	6.41	0.66
POCS0512	2.62	0.04
POCS0513	7.56	0.89
POCS0514	2.82	0.28
POCS0515	7.52	1.12
POCS0516	2.84	0.26
POCS103	2.16	0.38
POCS104	8.13	0.89
POCS105	3.61	1.31
POCS1010	7.56	1.25
POCS1011	2.93	0.41
POCS1012	2.45	0.07
POCS1013	6.60	0.75
POCS154	8.47	1.14
POCS155	5.25	1.18
POCS156	2.81	0.34
POCS1514	7.47	0.83
POCS1515	3.98	0.52
POCS1516	4.93	1.02
POCS204	9.84	1.41
POCS206	2.16	0.38
POCS2010	2.39	0.14
POCS2011	7.12	1.17
POCS2014	4.87	0.28
POCS2015	4.73	0.38
POCS251	13.46	2.51
POCS257	2.57	0.04
POCS258	9.21	1.68
POCS259	1.30	1.03

**Table S1e.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
POCS2510	2.27	0.27
POCS2513	2.31	0.21
POCS2514	6.59	1.04
POCS2516	5.48	0.67
POCS2517	4.20	0.80
POCS301	13.90	3.54
POCS307	0.91	1.33
POCS308	8.53	1.87
POCS309	2.45	0.08
POCS3012	2.19	0.34
POCS3013	6.68	1.05
POCS3014	5.52	0.65
POCS3016	1.95	0.43
POCS351	12.53	3.62
POCS352	5.91	0.79
POCS353	6.63	1.30
POCS355	2.92	0.52
POCS356	4.18	0.78
POCS357	8.69	1.68
POCS358	3.38	0.14
POCS359	8.24	1.11
POCS3510	3.24	0.29
PTA	11.26	2.54
RPB	25.02	4.15
SCSN03	8.17	2.07
SCSN06	9.75	0.99
SCSN09	10.32	1.75
SCSN12	9.28	1.47
SCSN15	10.76	1.48
SCSN18	10.03	1.56
SCSN21	9.65	1.75
SEY	14.95	1.26
SHM	15.09	2.51
STM	14.69	2.73
SYO	13.63	3.18
TAP	12.66	4.71
TDF	10.66	2.59

**Table S1f.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
UTA	16.87	2.20
UUM	16.92	2.08
WIS	16.90	2.55
WPC3	18.40	5.89
WPC5	18.79	3.07
WPC7	16.47	5.77
WPC8	16.84	4.33
WPC12	16.54	3.41
WPC15	13.74	3.73
WPC20	15.89	4.57
WPC35	8.11	1.35
WPC38	6.34	2.60
ZEP	15.93	2.35
CGO	16.62	3.71
SURGUT1	29.22	12.87
SURGUT2	28.39	12.15
SURGUT3	28.25	11.05
SURGUT4	29.75	12.58
SURGUT5	28.42	11.86
SURGUT6	28.43	10.57
SURGUT7	27.41	9.85
SURGUT8	27.97	10.97
TOHOKU4	15.74	5.91
TOHOKU5	14.66	4.80
TOHOKU6	17.83	4.64
TOHOKU7	22.46	5.60
TOHOKU8	20.70	5.01
TOHOKU9	21.05	6.11
TOHOKU10	16.90	4.87
TOHOKU11	19.06	4.82
TOHOKU12	21.21	5.20
TOHOKU13	19.25	4.45
TOHOKU14	17.77	5.83
TOHOKU15	15.11	9.16
TOHOKU17	13.24	5.10
TOHOKU18	6.20	2.02
TOHOKU19	8.68	1.39

**Table S1g.** Root-mean-square deviations of the differences between measurements and modeled mixing ratios. The first column shows the model results using prior emissions and the second column shows the same with posterior emissions.

Station	prior mixing ratio RMSD	posterior mixing ratio RMSD
TOHOKU20	8.02	1.25
TOHOKU21	6.62	3.63
TOHOKU22	7.69	0.81
TOHOKU23	8.47	2.78
TOHOKU24	5.00	2.01
TOHOKU25	4.48	2.42
TOHOKU26	6.85	1.71
TOHOKU27	6.17	1.71
TOHOKU28	4.79	2.27
TOHOKU29	6.45	1.03
TOHOKU30	3.98	2.24
TOHOKU31	7.00	3.00
TOHOKU32	9.33	2.44
TOHOKU33	5.09	1.53
TOHOKU34	3.50	3.83
TOHOKU35	4.83	0.76
TOHOKU36	5.77	0.94
TOHOKU37	7.23	1.92
TOHOKU38	6.21	0.60
TOHOKU39	6.52	2.60
TOHOKU40	10.92	4.49
TOHOKU41	12.88	6.26
TOHOKU42	14.40	3.03
TOHOKU43	14.29	4.10
TOHOKU44	17.19	5.07
TOHOKU45	17.19	4.83
TOHOKU46	13.97	4.20
TOHOKU47	12.17	4.03
CSIRO1	24.40	4.66
CSIRO2	19.05	2.87
CSIRO3	25.56	7.93
CSIRO4	16.54	3.08
CSIRO5	23.99	5.37
CSIRO6	19.91	2.92
CSIRO7	19.83	3.26
CSIRO8	21.83	4.19