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Supplement of

Sources, transport and deposition of iron in the global atmosphere

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Supplementary material

Table S1. The removal efficiencies of different dust abatement facilities at different sizes (Zhao et al., 2008).

	Particle sizes		
	0-1μm	**1-10μm**	**>10 μm**
Cyclone	10%	70%	90%
Scrubber	50%	90%	99%
Electrostatic precipitator	93.62%	97.61%	99.25%
No abatement	0	0	0

Table S2. Iron content in coal (%) by country. Sample number (N), mean, standard deviation (SD), and geomean are listed. The data were compiled from the World Coal Quality Inventory (Tewalt, 2010).

Country	N	Mean	SD	Geomean
China	332	0.98	0.77	0.73
US	117	0.62	0.88	0.28
Russia	12	0.79	1.25	0.36
Mongolia	37	0.76	0.73	0.53
Kazakhstan	18	0.54	0.53	0.34
Japan	2	0.60	0.02	0.60
South Korea	11	0.58	0.51	0.41
North Korea	50	0.87	0.72	0.65
Philippines	6	0.76	0.41	0.69
Vietnam	6	0.69	0.52	0.46
Thailand	23	1.82	1.80	1.12
India	4	2.43	1.05	2.29
Indonesia	8	0.60	0.43	0.48
Malaysia	2	0.80	0.14	0.79
Australia	10	0.46	0.30	0.38
Afghanistan	118	2.36	4.35	1.09
Iran	57	1.36	0.97	1.01
Turkey	71	2.94	1.65	2.48
Egypt	23	3.29	2.70	2.48
Georgia	1	1.02	-	1.02
Ukraine	33	1.67	1.51	0.88
Norway	27	1.13	2.63	0.55
Slovak Republic	8	0.93	0.71	0.76
Romania	12	1.07	1.02	0.77
Serbia	5	1.55	1.49	1.03
Greece	2	2.24	0.04	2.23
France	3	0.40	0.02	0.40
Spain	10	1.34	0.60	1.18
Belgium	10	0.74	0.63	0.51
United Kingdom	77	1.39	1.49	0.95
Nigeria	22	1.28	2.08	0.46
Tanzania	24	1.12	0.90	0.85
Zambia	14	2.07	3.35	0.85
Zimbabwe	6	0.25	0.29	0.12
Botswana	17	1.41	0.75	1.22
South Africa	40	0.54	0.34	0.41
Canada	12	0.98	0.51	0.88
Mexico	1	1.47	-	1.47
Brazil	63	3.47	2.92	2.51
Venezuela	16	0.86	1.28	0.28
Colombia	16	0.46	0.93	0.18
Peru	16	0.55	0.57	0.34
Chile	23	1.20	1.17	0.86
Argentina	7	6.01	13.89	1.28
New Zealand	7	0.59	0.36	0.40

Table S3. Information for the observed Fe concentrations in the surface air collected in the literature.

Region	Period	Start month	End month	Lat	Lon	Size	Fe conc, ng m^{-3}	Reference
Fuzhou	2007	4	5	26.08	119.30	$PM_{2.5}$	1115	Xu et al., 2012
Fuzhou	2007	9	9	26.08	119.30	$PM_{2.5}$	219	Xu et al., 2012
Fuzhou	2007	11	11	26.08	119.30	$PM_{2.5}$	723	Xu et al., 2012
Fuzhou	2007	1	1	26.08	119.30	$PM_{2.5}$	563	Xu et al., 2012
Shanghai	1999-2000	1	12	31.20	121.40	$PM_{2.5}$	900	Ye et al., 2003
Hangzhou	2001-2002	1	12	30.20	120.10	PM_{10}	2190	Cao et al., 2009
Beijing	2001-2003	1	12	39.90	116.40	PM_{10}	5500	Okuda, et al. 2004
Beijing	2002-2003	6	8	39.90	116.40	PM_{10}	3730	Sun et al., 2004
Beijing	2002-2003	1	1	39.90	116.40	PM_{10}	2620	Sun et al., 2004
Yong'an	2007	4	4	25.97	117.36	$PM_{2.5}$	736	Yin et al., 2012
Yong'an	2007	11	11	25.97	117.36	$PM_{2.5}$	930	Yin et al., 2012
Yong'an	2007	1	1	25.97	117.36	$PM_{2.5}$	582	Yin et al., 2012
Chengdu	2009	4	4	30.66	104.00	$PM_{2.5}$	4850	Tao et al., 2013
Chengdu	2009	5	5	30.66	104.00	$PM_{2.5}$	892	Tao et al., 2013
Jinan	2006-2007	3	5	36.67	117.03	$PM_{2.5}$	1940	Yang et al., 2012
Jinan	2006-2007	6	8	36.67	117.03	$PM_{2.5}$	990	Yang et al., 2012
Jinan	2006-2007	9	11	36.67	117.03	$PM_{2.5}$	1610	Yang et al., 2012
Jinan	2006-2007	1	2	36.67	117.03	$PM_{2.5}$	2020	Yang et al., 2012
Mt. Yulong	2010	1	2	27.42	100.13	TSP	1258	Zhang, et al., 2012
Beijing	2000	1	12	39.80	116.47	$PM_{2.5}$	1150	Yang et al., 2005
Shanghai	2000	1	12	31.23	121.32	$PM_{2.5}$	820	Yang et al., 2005
Zhengzhou	2010	3	5	34.80	113.52	$PM_{2.5}$	1896	Geng et al., 2013
Zhengzhou	2010	6	8	34.80	113.52	$PM_{2.5}$	370	Geng et al., 2013
Zhengzhou	2010	9	11	34.80	113.52	$PM_{2.5}$	1068	Geng et al., 2013
Zhengzhou	2010	1	2	34.80	113.52	$PM_{2.5}$	1435	Geng et al., 2013
Lijiang	2009	3	5	27.42	100.13	TSP	510	Zhang et al., 2013.
Hongkong	2001	1	1	22.3	114.2	PM_{10}	701	Cohen,2004
Cheju	2008	4	4	33.28	126.17	TSP	500	Kim et al., 2013
Cheju	2008	7	7	33.28	126.17	TSP	120	Kim et al., 2013
Cheju	2008	10	10	33.28	126.17	TSP	200	Kim et al., 2013
Cheju	2008	1	1	33.28	126.17	TSP	130	Kim et al., 2013
East China Sea	2005-2007	3	4	25.08	123.2	TSP	410	Hsu et al., 2010

Figure S1. Frequency distribution of Fe contents in coal for all countries (a), China (b), and the UK (c), and Fe contents in wood (d) and grass/straw (e).

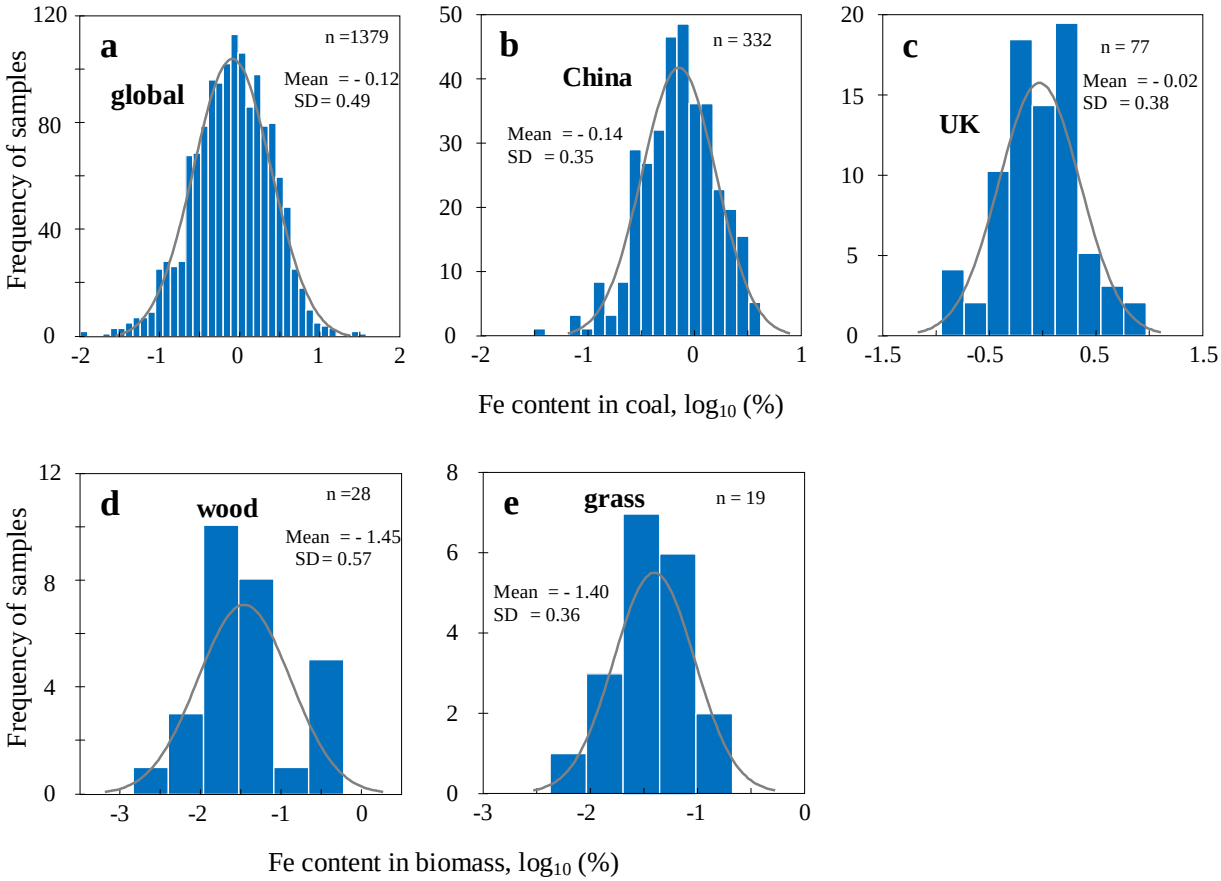


Figure S2. Iron content in clay (A) and silt (B) -sized particles in surface soil (CASE 2) derived from the mineralogical data set by Journet et al. (2014).

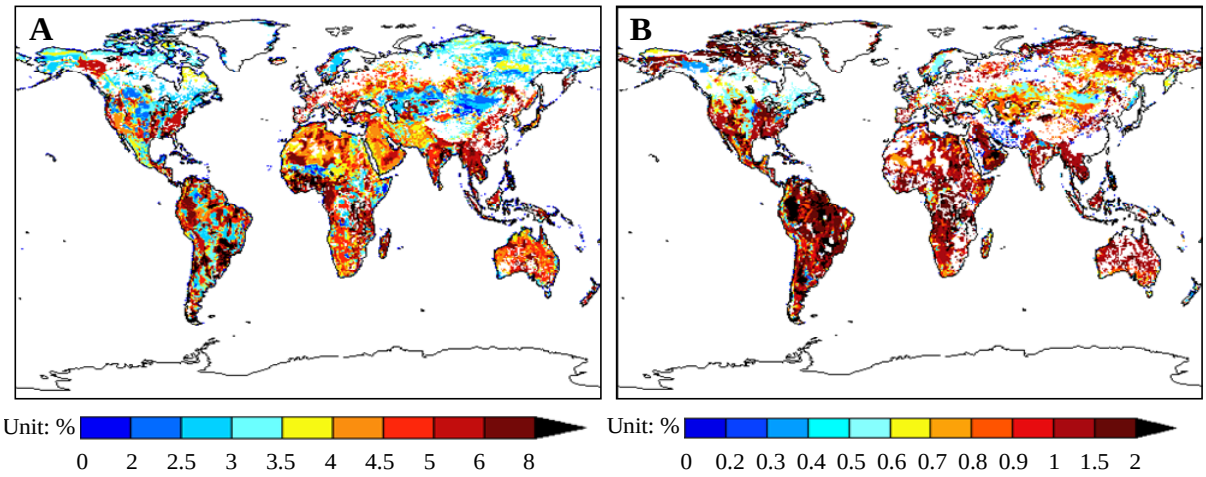


Figure S3. Maps of Fe emissions from all combustion sources at a resolution of 0.5°×0.5° at 10-year intervals for 1960–2000 and for 2007. Unit: mg m^{-3} yr^{-1}.

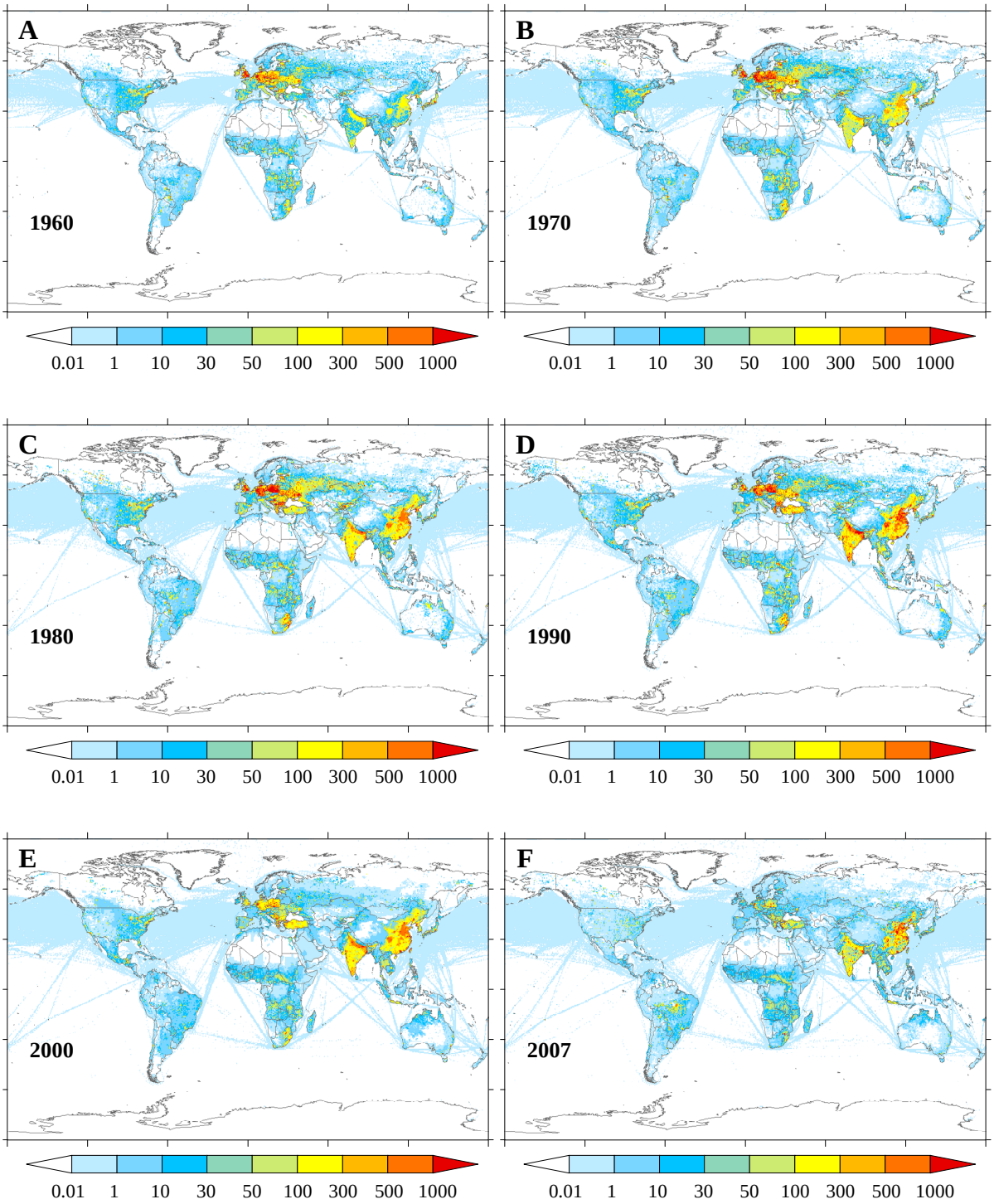


Figure S4. Zonal distribution of the modelled (blue) and observed (red) Fe concentrations over the Atlantic Ocean from 70°S to 60°N. The modelled Fe concentrations were derived with (model 1) or without (model 2) using the new mineralogy data. Error bars show the geometric standard deviations of Fe concentrations at all sites in each region.

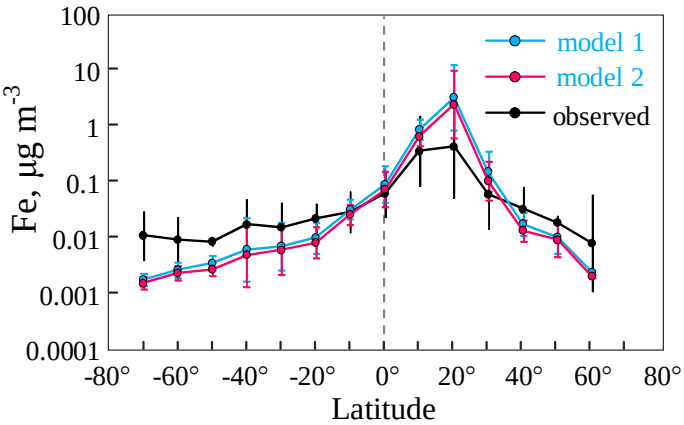
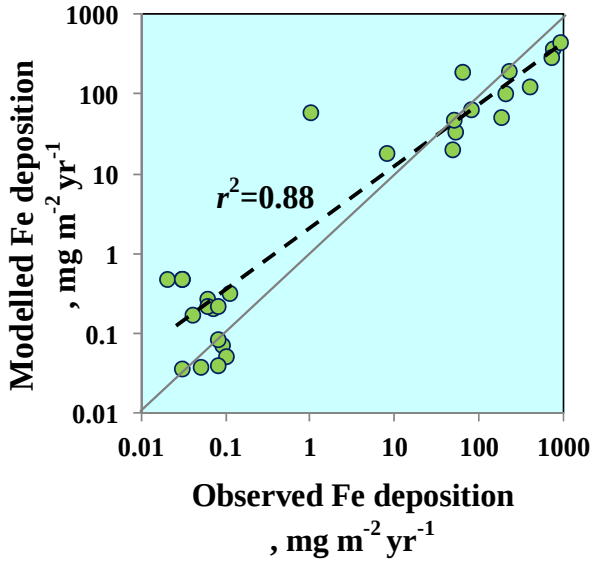


Figure S5. Plot of modelled and observed deposition rates of Fe. The fitted curve of all data points is shown as a red dashed line with the square of the correlation coefficient (r^2).



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