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Supplement of

Estimation of emissions from biomass burning in China (2003–2017) based on MODIS fire radiative energy data

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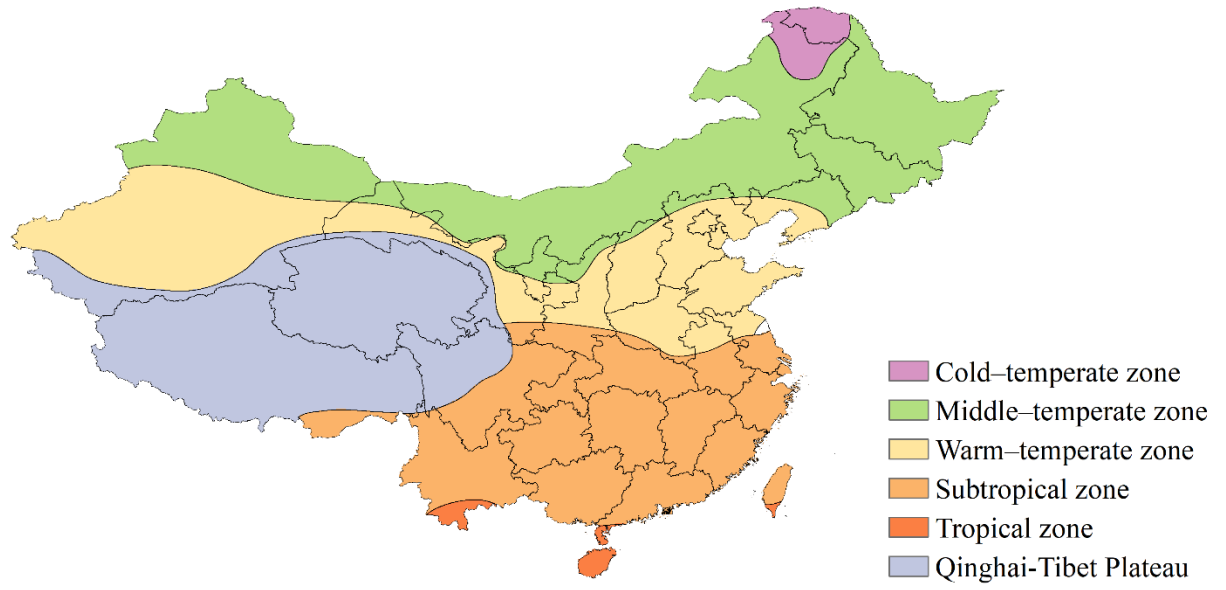


Figure S1. Distribution of six temperature zones in China (excluding small islands in the South China Sea).

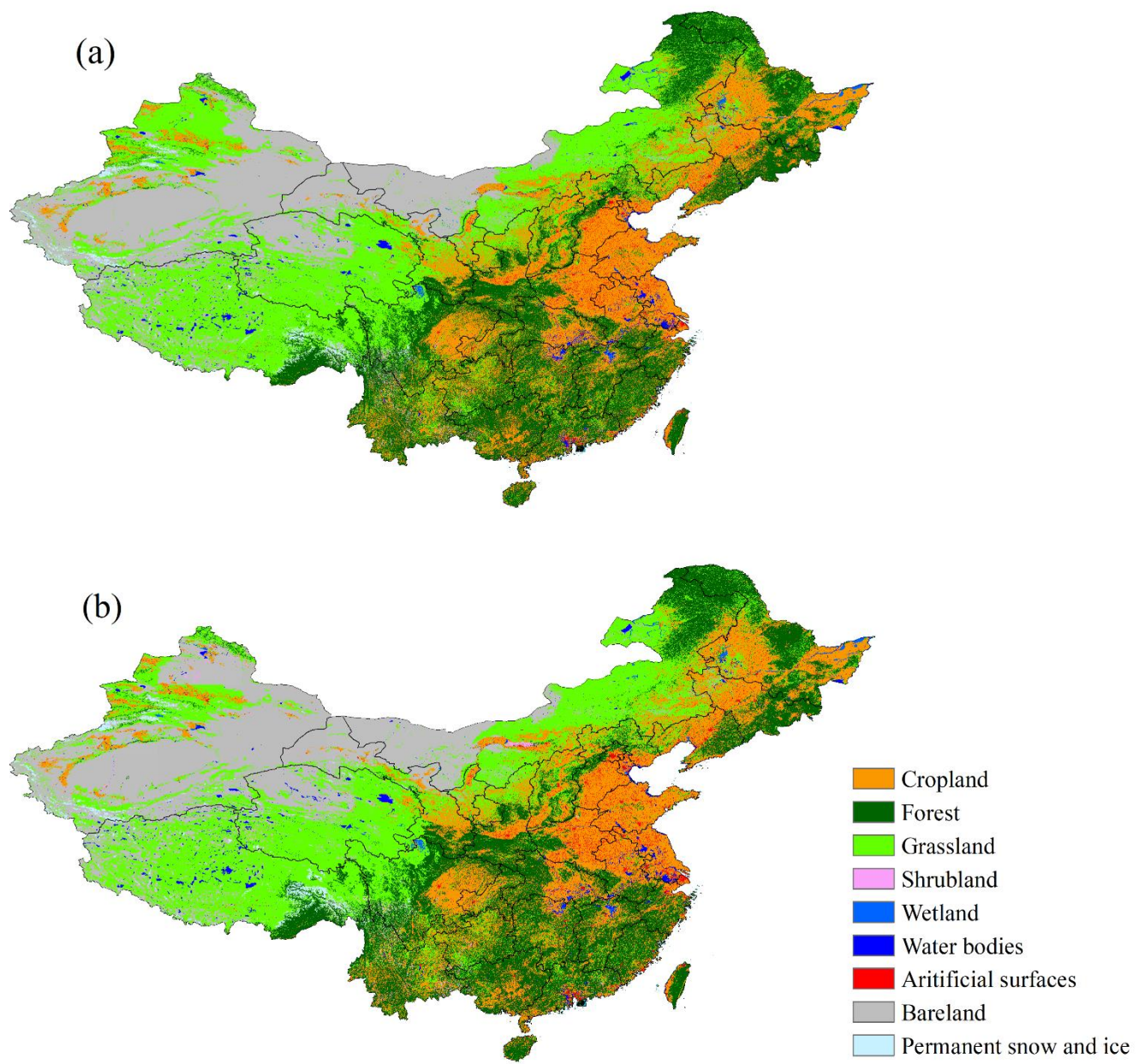


Figure S2. GlobeLand30 land cover characterization map of China (small islands in the South China Sea are not included). Map for (a) 2000; (b) 2010.

Table S1. Emission factors of multiple pollutants for each land use type (unit: g kg⁻¹).

Category	Land use type	CO ₂ ^a	CO ^a	CH ₄ ^a	NMHC ^a	NO _x ^a	NH ₃ ^a	SO ₂ ^a	BC ^b	OC ^b	PM _{2.5} ^a	PM ₁₀ ^a
forest	Dominated by evergreen conifer trees (canopy >2m). Tree cover >60%.	1700.0	83.7	3.2	10.4	3.1	1.2	0.6	0.8	7.6	12.7	13.1
forest	Dominated by evergreen broadleaf and palmate trees (canopy >2m). Tree cover >60%.	1710.0	88.0	4.2	13.3	2.0	1.0	0.5	0.8	5.7	10.2	12.8
forest	Dominated by deciduous needleleaf (larch) trees (canopy >2m). Tree cover >60%.	1700.0	83.7	3.2	10.4	3.1	1.2	0.6	0.8	7.6	12.7	13.1
forest	Dominated by deciduous broadleaf trees (canopy >2m). Tree cover >60%.	1703.2	87.0	3.4	10.8	3.0	1.0	0.6	0.8	7.6	12.3	12.8
forest	Dominated by neither deciduous nor evergreen (40-60% of each) tree type (canopy >2m). Tree cover >60%.	1704.4	86.3	3.6	11.5	2.7	1.1	0.6	0.8	7.0	11.7	12.9
shrubland	Dominated by woody perennials (1-2m height) >60% cover.	1669.4	84.7	3.4	5.8	3.5	0.9	0.5	0.5	6.3	7.9	8.5
shrubland	Dominated by woody perennials (1-2m height) 10-60% cover.	1669.4	84.7	3.4	5.8	3.5	0.9	0.5	0.5	6.3	7.9	8.5
grassland	Tree cover 30-60% (canopy >2m).	1669.4	84.7	3.4	5.8	3.5	0.9	0.5	0.5	6.3	7.9	8.5
grassland	Tree cover 10-30% (canopy >2m).	1651.1	82.1	3.4	5.9	3.8	0.9	0.5	0.5	4.8	7.1	9.2
grassland	Dominated by herbaceous annuals (<2m).	1651.1	82.1	3.4	5.9	3.8	0.9	0.5	0.5	4.8	7.1	9.2
cropland	At least 60% of area is cultivated cropland.	1353.5	76.1	2.8	9.8	2.9	1.4	0.4	0.6	2.0	5.0	6.3
cropland	Mosaics of small-scale cultivation 40-60% with natural tree, shrub, or herbaceous vegetation.	1669.4	84.7	3.4	5.8	3.5	0.9	0.5	0.5	6.3	7.9	8.5

Note: Superscript letters indicate the data source: ^a(Andreae and Merlet, 2001;Streets et al., 2003;Cao et al., 2004;Michel et al., 2005;Wiedinmyer et al., 2006).
^b(Andreae and Merlet, 2001;Streets et al., 2001;Reddy and Venkataraman, 2002;Cao et al., 2006).

Table S2. Uncertainties of emission factors for different pollutants.

Pollutants	Uncertainty (%) ^a
CO ₂	6
CO	32
CH ₄	61
NMHC	38
NO _x	58
NH ₃	58
SO ₂	50
BC	50
OC	50
PM _{2.5}	38
PM ₁₀	50

Note: Superscript letters indicate the data source: ^a(Huang et al., 2012)

References

Andreae, M. O., and Merlet, P.: Emission of trace gases and aerosols from biomass burning, *Global Biogeochemical Cycles*, 15, 955-966, doi:10.1029/2000GB001382, 2001.

Cao, G., Zheng, F., and Wang, Y.: Inventory of TSP, PM₁₀, PM_{2.5} emissions from biomass burning in China (in Chinese), *The Chinese Journal of Process Engineering*, 4(Supplement), 700-704, 2004.

Cao, G., Zhang, X., Zheng, F., and Wang, Y.: Estimating the Quantity of Crop Residues Burnt in Open Field in China (in Chinese), *Resources Science*, 28, 9-13, 2006.

Huang, X., Li, M., Li, J., and Song, Y.: A high-resolution emission inventory of crop burning in fields in China based on MODIS Thermal Anomalies/Fire products, *Atmospheric Environment*, 50, 9-15, 2012.

Michel, C., Liousse, C., Gregoire, J. M., Tansey, K., Carmichael, G. R., and Woo, J. H.: Biomass burning emission inventory from burnt area data given by the SPOT-VEGETATION system in the frame of TRACE-P and ACE-Asia campaigns, *J Geophys Res-Atmos*, 110, doi:10.1029/2004jd005461, 2005.

Reddy, M. S., and Venkataraman, C.: Inventory of aerosol and sulphur dioxide emissions from India. Part II - biomass combustion, *Atmos Environ*, 36, 699-712, doi:10.1016/S1352-2310(01)00464-2, 2002.

Streets, D. G., Gupta, S., Waldhoff, S. T., Wang, M. Q., Bond, T. C., and Yiyun, B.: Black carbon emissions in China, *Atmospheric Environment*, 35, 4281-4296, doi:10.1016/S1352-2310(01)00179-0, 2001.

Streets, D. G., Yarber, K. F., Woo, J. H., and Carmichael, G. R.: Biomass burning in Asia: Annual and seasonal estimates and atmospheric emissions, *Global Biogeochemical Cycles*, 17, n/a-n/a, doi:10.1029/2003gb002040, 2003.

Wiedinmyer, C., Quayle, B., Geron, C., Belote, A., McKenzie, D., Zhang, X., O'Neill, S., and Wynne, K. K.: Estimating emissions from fires in North America for air quality modeling, *Atmospheric Environment*, 40, 3419-3432, doi:10.1016/j.atmosenv.2006.02.010, 2006.