Supporting information

New estimates of direct N_2O emissions from Chinese croplands from 1980 to 2007 using localized emission factors

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We estimated the maximum and minimum emission factors of paddy fields using the original raw data and log- and cube root-transformed data, and the defined class interval according to the difference between the maximum and minimum and the number of classifications, here calculated in accordance with 10 groups. Linear interpolation was applied to calculate the values that cannot be found directly in the table of normal area according to accumulated frequency, and the last obtained t values ($\bar{t} \pm \delta t$) were also used to deduce the origin value by the method of linear interpolation (Table S1). The average group value ± standard error ($t = \bar{t} \pm \delta t$) from the method of direct calculation with original data through equations (1) and (2) using the values in Table S1 were 1.0977 and 0.682, respectively, and the corresponding origin values as calculated by linear interpolation were 2.44% and 1.93%, respectively, so giving a mean of 2.18% with a standard error of 0.25%. The values of $\bar{t} \pm \delta t$ from using log-transformed data were 0.3745 and -1.1608, and the corresponding values of as calculated by linear interpolation were -0.602 and -0.660, respectively, giving a mean of -0.631 and standard error of 0.029, and then converted into original values to give a mean of 0.23% with a standard error of 1.07%. The values of $\bar{t} \pm \delta t$ from the cube root-transformed data were 0.7364 and -0.6966, and the corresponding values as calculated by linear interpolation were 0.953 and 0.533, respectively, giving a mean of 0.743 with a standard error of 0.350, and then converted into origin values to give a mean of 0.41% with a standard error of 0.04%.

We used the same method to calculate the emission factors of uplands (Table S2). The values of $\bar{t} \pm \delta t$ from the method of direct calculation using the original data were 1.1009 and -0.0893, respectively, and the corresponding original values as calculated by linear interpolation were 2.88% and 0.92%, respectively, giving a mean of 1.90% with a standard error of 0.98%. The values of $\bar{t} \pm \delta t$ using log-transformed data were 0.3681 and -1.1235, and the corresponding values as calculated by linear interpolation were 0.334 and -0.543, respectively, giving a mean of -0.105 with a standard error of 0.439, and then converted into origin values to give a mean of 0.79% with a standard error of 0.36%. The values of $\bar{t} \pm \delta t$ using cube root-transformed data were 0.7146 and -0.7706, and the corresponding value as calculated by linear interpolation were 1.215 and 0.817, respectively, giving a mean of 1.106 with a standard error of 0.279, and then converted into origin values to give a mean of 1.05% with a standard error of 0.02%.

Table S1 Normalization of N_2O emission factors from Chinese paddy fields

Method	Classification	Frequency	Accumulated frequency	Probability scale	Class interval	f-Frequency/ Class interval	t-Group value
Original data	0.0036~	87	0.4462	-∞~	∞	0	/
	0.2163~	21	0.5538	-0.1354~	0.2708	77.5537	0
	0.4291~	15	0.6308	0.1354~	0.1985	75.5629	0.2346
	0.6418~	18	0.7231	0.3339~	0.2581	69.7377	0.4630
	0.8545~	24	0.8462	0.5920~	0.4280	56.0656	0.8060
	1.0672~	12	0.9077	1.0200~	0.3066	39.1377	1.1734
	1.2780~	6	0.9385	1.3267~	0.2153	27.8671	1.4343
	1.4927~	0	0.9385	1.5420~	0	0	1.5420
	1.7054~	6	0.9692	1.5420~	0.3276	18.3145	1.7058
	1.9181~	8	1	1.8696~	∞	0	/
	Total	195	/	/	/	364.2392	/
Log-transformed data	-2.4413~	3	0.0154	-∞~	∞	0	/
	-2.1643~	3	0.0308	-2.1600~	0.2904	10.3306	-2.0148
	-1.8873~	9	0.0769	-1.8696~	0.4435	20.2931	-1.6479

	-1.6103~	6	0.1077	-1.4261~	0.1916	31.3152	-1.3303
	-1.3334~	9	0.1538	-1.2345~	0.2144	41.9776	-1.1273
	-1.0564~	33	0.3231	-1.0201~	0.5610	58.8235	-0.7396
	-0.7794~	36	0.5077	-0.4591~	0.4784	75.2508	-0.2199
	-0.5024~	24	0.6308	0.0193~	0.3146	76.2873	0.1766
	-0.2254~	48	0.8769	0.3339~	0.8258	58.1255	0.7468
	0.0516~	24	1	1.1597~	∞	0	/
	Total	195	/	/	/	372.4037	/
Cube root-transformed data	0.1535~	15	0.0769	-∞~	∞	0	/
	0.2669~	9	0.1231	-1.4261~	0.2664	33.7838	-1.2929
	0.3802~	15	0.2000	-1.1597~	0.3181	47.1550	-1.0007
	0.4935~	48	0.4462	-0.8416~	0.7062	67.9694	-0.4885
	0.6068~	18	0.5385	-0.1354~	0.2320	77.5996	-0.0194
	0.7202~	15	0.6154	0.0966~	0.1968	76.2040	0.1950
	0.8335~	21	0.7231	0.2934~	0.2986	70.3282	0.4427
	0.9468~	30	0.8769	0.5920~	0.5677	52.8448	0.8759
	1.0602~	12	0.9385	1.1597~	0.3823	31.3890	1.3509

	1.1735~	12	1	1.5420~	∞	0	/
	Total	195	/	/	/	457.2738	/

Table S2 Normalization of N_2O emission factors from Chinese uplands

Method	Classification	Frequency	Accumulated frequency	Probability scale	Class interval	f-Frequency/ Class interval	t-Group value
Original data	0.0350~	57	0.2184	-∞~	∞	0	/
	0.5115~	66	0.4713	-0.7776~	0.7055	93.5507	-0.4249
	0.9880~	33	0.5977	-0.0721~	0.3195	103.2864	0.0877
	1.4645~	27	0.7011	0.2474~	0.2803	96.3254	0.3876
	1.9410~	24	0.7931	0.5277~	0.2895	82.9016	0.6725
	2.4175~	12	0.8391	0.8172~	0.1735	69.1643	0.9040
	2.8940~	15	0.8966	0.9907~	0.2715	55.2486	1.1265
	3.3705~	9	0.9310	1.2622~	0.2214	40.6504	1.3729
	3.8470~	9	0.9655	1.4836~	0.3351	26.8577	1.6512
	4.3235~	9	1	1.8187~	∞	0	/
	Total	261	/	/	/	567.9849	/

Log-transformed data	-1.4559~	6	0.0230	-∞~	∞	0	/
	-1.2422~	1	0.0268	-1.9956~	0.0659	15.1745	-1.9627
	-1.0285~	17	0.0920	-1.9297~	0.6009	28.2909	-1.6293
	-0.8148~	6	0.1149	-1.3288~	0.1281	46.8384	-1.2648
	-0.6011~	21	0.1954	-1.2007~	0.3425	61.3139	-1.0295
	-0.3873~	30	0.3103	-0.8582~	0.3633	82.5764	-0.6766
	-0.1736~	57	0.5287	-0.4949~	0.5670	100.5291	-0.2114
	0.0401~	33	0.6552	0.0721~	0.3272	100.8557	0.2357
	0.2538~	48	0.8391	0.3993~	0.5914	81.1633	0.6950
	0.4675~	42	1	0.9907~	∞	0	/
	Total	261	/	/	/	516.7422	/
Cube root-transformed data	0.3271~	6	0.0230	-∞~	∞	0	/
	0.4631~	21	0.1034	-1.9956~	0.7334	28.6338	-1.6289
	0.5991~	24	0.1954	-1.2622~	0.4040	59.4059	-1.0602
	0.7350~	30	0.3103	-0.8582~	0.3633	82.5764	-0.6766
	0.8710~	51	0.5057	--0.4949~	0.5093	100.1374	-0.2403
	1.007~	24	0.5977	0.0144~	0.2103	114.1010	0.1196

	1.1430~	**39**	**0.7471**	**0.2247~**	**0.4408**	**88.4835**	**0.4451**
	1.2789~	**24**	**0.8391**	**0.6655~**	**0.3252**	**73.8007**	**0.8281**
	1.4149~	**24**	**0.9310**	**0.9907~**	**0.4929**	**48.6914**	**1.2372**
	1.5509~	**18**	**1**	**1.4836~**	∞	**0**	**/**
	Total	**261**	**/**	**/**	**/**	**595.8302**	**/**