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Supplement of

Individual coal mine methane emissions constrained by eddy covariance measurements: low bias and missing sources

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Table S1: Emission Factors used in this study

Category		CH$_4$ Emission Factors / (m^3 t^{-1})				
Underground	**Low**	3.34	0.739	4.53	2.94	3.42
	High	22.1	11.4	21.8	26.2	22.7
	Outburst	22.1	41.0	21.8	26.2	46.4
Surface		2.5		2.5	2.5	2.5
Default		12.7	5.80	12.7	14.7	12.7
Abandoned	**Surface/Low**	0.5		0.5	0.5	0.5
	High/Outburst	3		3	3	3
Reference		(Zheng et al., 2005; Sheng et al., 2019)	(Wang et al., 2013)	(Zheng et al., 2005; Huang et al., 2019)	(Zheng et al., 2005; Gao et al., 2021)	(Zheng et al., 2005; Wang et al., 2019)

Table S2: Statistic information of constrained CMM flux in ug m² s⁻¹. For all data, we only show 3 valid digits.

		Low Rank Q1	Low Rank Q2	Low Rank Q3	High Rank Q1	High Rank Q2	High Rank Q3
Percentiles	10	0.12	0.27	0.31	1.75	1.75	1.62
	20	0.26	0.60	0.69	4.23	4.23	3.94
	30	0.55	1.29	1.48	9.13	9.13	8.90
	40	0.95	2.22	2.54	16.5	16.5	16.1
	50	1.66	3.88	4.44	27.0	27.0	26.2
	60	2.76	6.48	7.40	46.7	46.7	46.7
	70	4.87	11.4	13.0	78.8	78.8	77.2
	80	10.1	23.7	27.1	188	188	174
	90	21.3	50.0	57.2	333	333	333

		Outburst Rank Q1	Outburst Rank Q2	Outburst Rank Q3	Default Rank Q1	Default Rank Q2	Default Rank Q3	Flux 2021 Winter	Flux 2022 Summer
Percentiles	10	3.06	1.60	2.84	0.85	0.97	0.95	0.83	0.78
	20	5.89	3.09	5.47	2.62	2.97	2.90	1.97	2.70
	30	15.6	8.18	14.5	4.35	4.94	4.83	3.66	5.77
	40	30.0	15.7	27.9	8.19	9.30	9.08	6.05	9.99
	50	44.2	23.1	41.0	12.7	14.4	14.0	10.3	18.3
	60	85.0	44.5	78.9	23.1	26.2	25.6	16.0	29.0
	70	125	65.3	116	35.8	40.6	39.7	27.4	57.6
	80	240	126	223	95.1	108	105	50.2	89.3
	90	567	297	527	158	180	175	140	161

Table S3: detail in EPWP and GPWP.

	EDGAR-R1		EDGAR-R3		EDGAR-R5		EDGAR-R7		EDGAR-R9	
	+	-	+	-	+	-	+	-	+	-
Grid_Number	194	7	161	40	95	106	42	159	12	189
Total_Emissions (Gg d^{-1})	14.3	0.01	12.0	0.40	9.04	3.61	6.56	18.4	3.36	110.
	GFEI-R1		GFEI-R3		GFEI-R5		GFEI-R7		GFEI-R9	
Grid_Number	169	58	108	119	53	174	30	197	10	217
Total_Emissions (Gg d^{-1})	7.40	0.13	5.76	1.45	4.03	6.43	2.49	23.8	1.09	126.

References

Gao, J., Guan, C., Zhang, B., and Li, K.: Decreasing methane emissions from China's coal mining with rebounded coal production, Environ Res Lett, 16, 124037, https://doi.org/10.1088/1748-9326/ac38d8, 2021.

Huang, M., Wang, T., Zhao, X., Xie, X., and Wang, D.: Estimation of atmospheric methane emissions and its spatial distribution in China during 2015, Huanjing Kexue Xuebao/Acta Scientiae Circumstantiae, 39, 1371-1380, 2019.

Sheng, J., Song, S., Zhang, Y., Prinn, R. G., and Janssens-Maenhout, G.: Bottom-Up Estimates of Coal Mine Methane Emissions in China: A Gridded Inventory, Emission Factors, and Trends, Environ Sci Tech Let, 6, 473-478, https://doi.org/10.1021/acs.estlett.9b00294, 2019.

Wang, K., Zhang, J., Cai, B., and Yu, S.: Emission factors of fugitive methane from underground coal mines in China: Estimation and uncertainty, Appl Energ, 250, 273-282, https://doi.org/10.1016/j.apenergy.2019.05.024, 2019.

Wang, N., Zhu, T., Chen, S., and Luo, D. W.: Study on the Interprovincial Emission Factor of Chinese Coal Mine Methane, Appl Mech Mater, 295-298, 3354-3358, https://doi.org/10.4028/www.scientific.net/AMM.295-298.3354, 2013.

Zheng, S., Wang, Y., and Wang, Z.: Methane emissions to atmosphere from coal mine in China, Safety in Coal Mines, 36, 29-33, 2005.