Comprehensive Evaluation of Spatial Distribution and Temporal Trend of NO_2 , SO_2 , and AOD based on Satellite Observations over South and East Asia from 2011 to 2021

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Table S1 Summary of utilized satellite and emission inventory data.

Data Source/Platform	Atmospheric Composites	Units	Spatial Resolution	Temporal Resolution	Web Link
OMI/Aura	NO_2	Molecules/cm2	0.25º × 0.25º	Daily	https://giovanni.gsfc.nasa.gov/giovanni/ (Accessed on May 2022)
	SO_2	Dobson Unit*	0.25º × 0.25º	Daily	
MODIS/ Aqua	AOD at 550 nm	Unit less	1º × 1º	Daily	
PKU Emission Inventory	NO_x	g/km2/month	0.1º × 0.1º	Monthly	http://inventory.pku.edu.cn/home.html (Accessed on July 2022)
	SO2	g/km2/month	0.1º × 0.1º	Monthly	
	$PM_{2.5}$	g/km2/month	0.1º × 0.1º	Monthly	

*The Dobson Unit (DU) is converted into Molecules/cm2 (1 DU = 2.687×1016 Molecules/cm2) for unifying the unit for gaseous air pollutants.

Table S2 Statistical values of NO_2 hotspots over randomly selected cities in the study area.

Hotspot Cities	Countries	Lon (Deg.)	Lat (Deg.)	Confidence Level	Overall NO_2 ($\times 10^{15}$ molec/cm^2)	p Values
Kowloon	China	114.23	22.38	99%	10.11	0.0000020
Nanjing	China	118.77	32.05	99%	15.78	0.0058396
T`ai-chung	Taiwan	120.67	24.14	95%	4.54	0.0302960
Changsha	China	112.97	28.20	99%	7.14	0.0000200
Nanchang	China	115.89	28.67	99%	6.58	0.0001330
Hangzhou	China	120.17	30.25	99%	14.59	0.0000383

Chengdu	China	104.07	30.67	99%	8.43	0.0000010
Xian	China	108.88	34.27	99%	11.84	0.0300137
Luoyang	China	112.36	34.67	99%	11.91	0.0017900
Zhengzhou	China	113.64	34.76	99%	15.98	0.0106012
Tianjin	China	117.19	39.13	99%	18.32	0.0061956
Beijing	China	116.39	39.91	99%	17.46	0.0020652
Baotou	China	109.98	40.65	99%	7.37	0.0000110
Seoul	S. Korea	127.01	37.54	99%	15.01	0.0001200
Dhaka	Bangladesh	90.41	23.71	99%	6.87	0.0000600
Faisalabad	Pakistan	73.08	31.41	95%	4.18	0.0255880
Islamabad	Pakistan	73.06	33.72	95%	4.53	0.0280660
Amritsar	India	74.87	31.63	99%	4.86	0.0036090
New Delhi	India	77.21	28.56	99%	6.87	0.0032000
Calcutta	India	88.33	22.54	95%	4.19	0.0021000

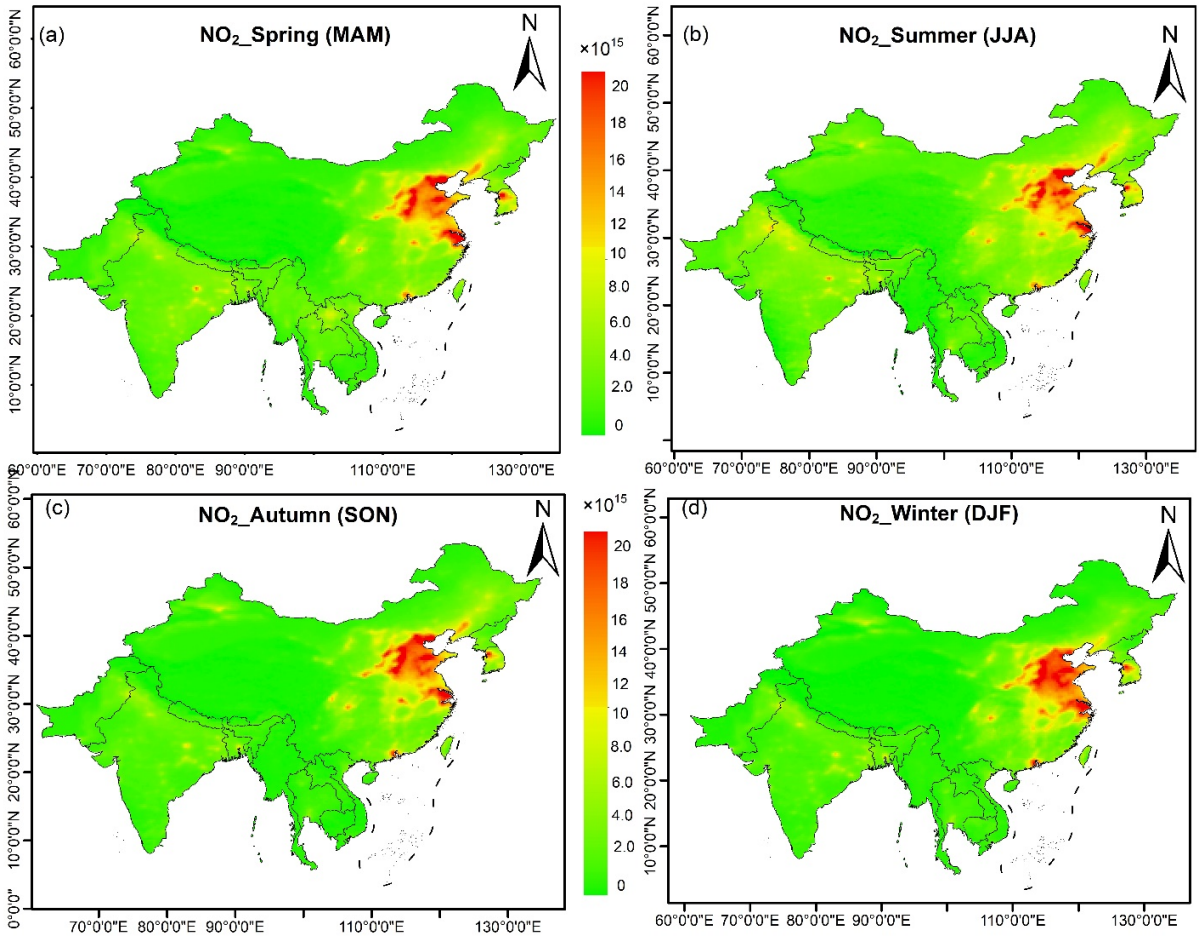

Figure S1. Seasonal distribution of NO_2 (in molecules /cm^2) during the period of 2011 to 2021.

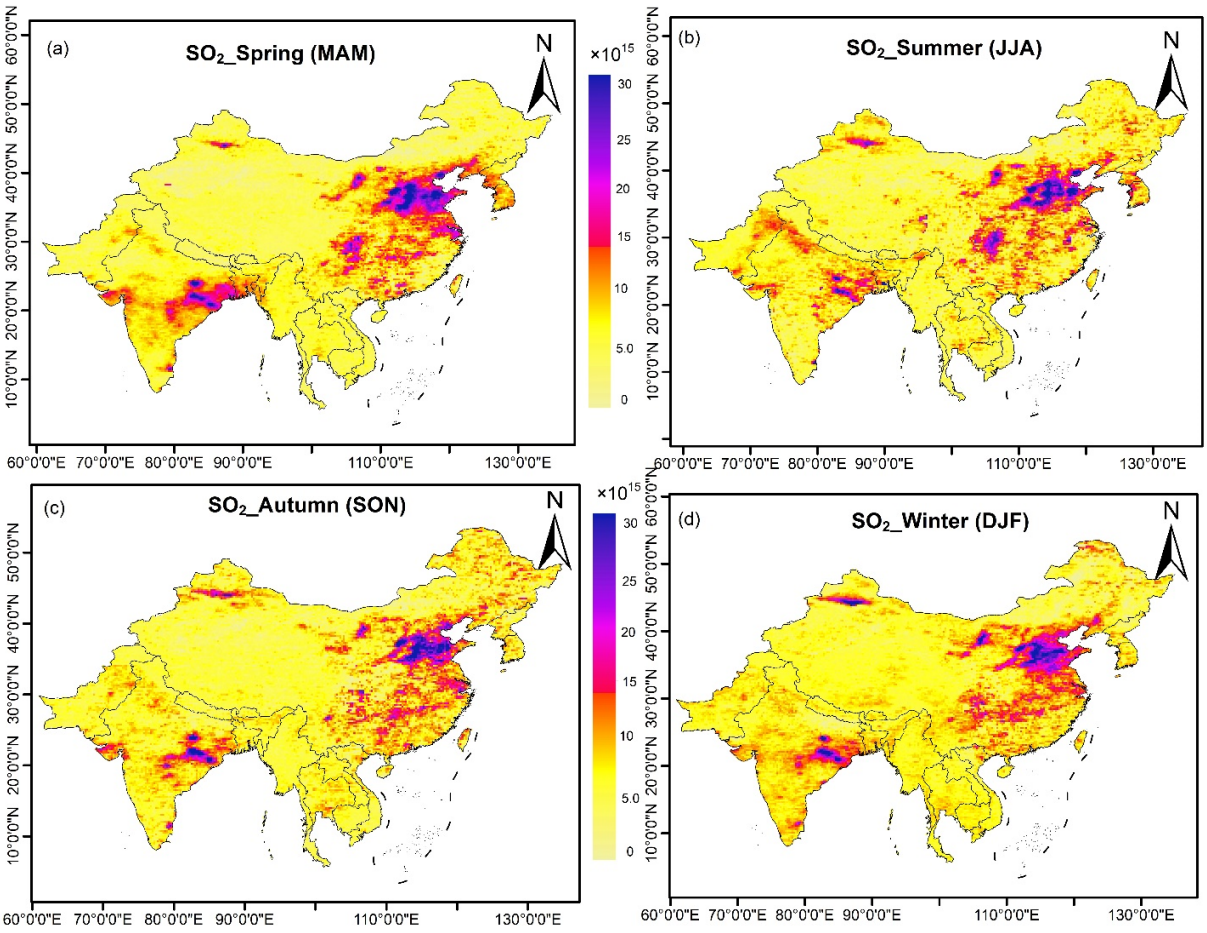

Figure S2. Seasonal distribution of SO_2 (in molecules /cm^2) during the period of 2011 to 2021.

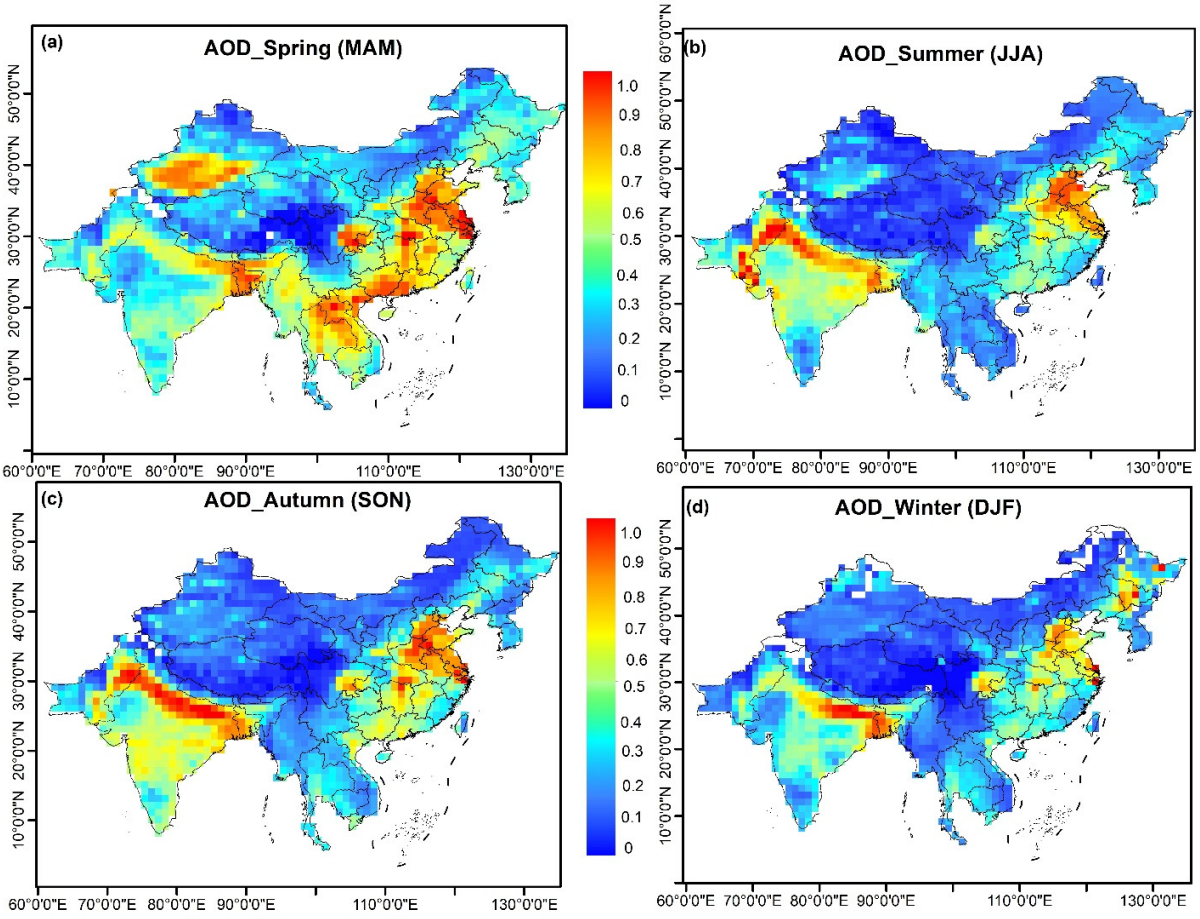

Figure S3. Seasonal distribution of AOD (unitless) during the period of 2011 to 2021.

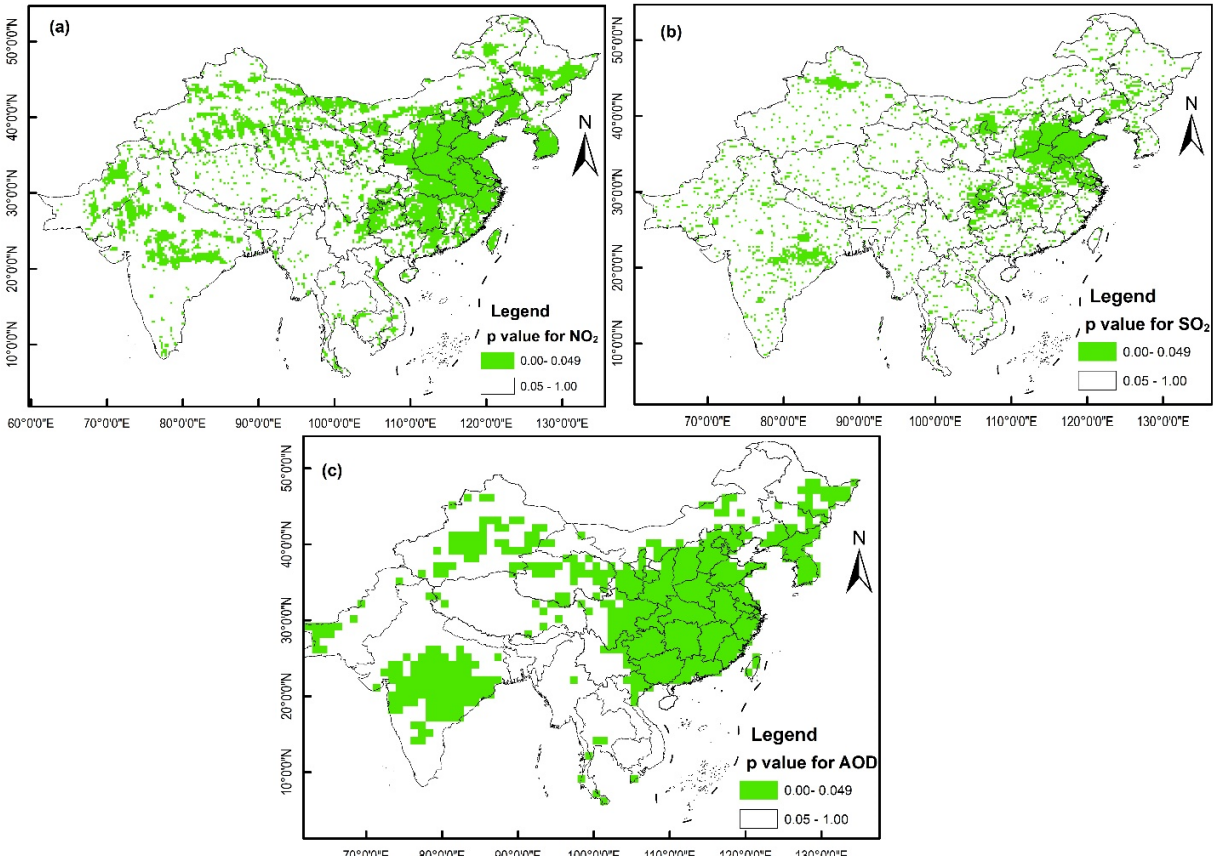

Figure S4. Respective P values for the regional distribution of the trend of (a) NO_2 and (b) SO_2, and (c) AOD.

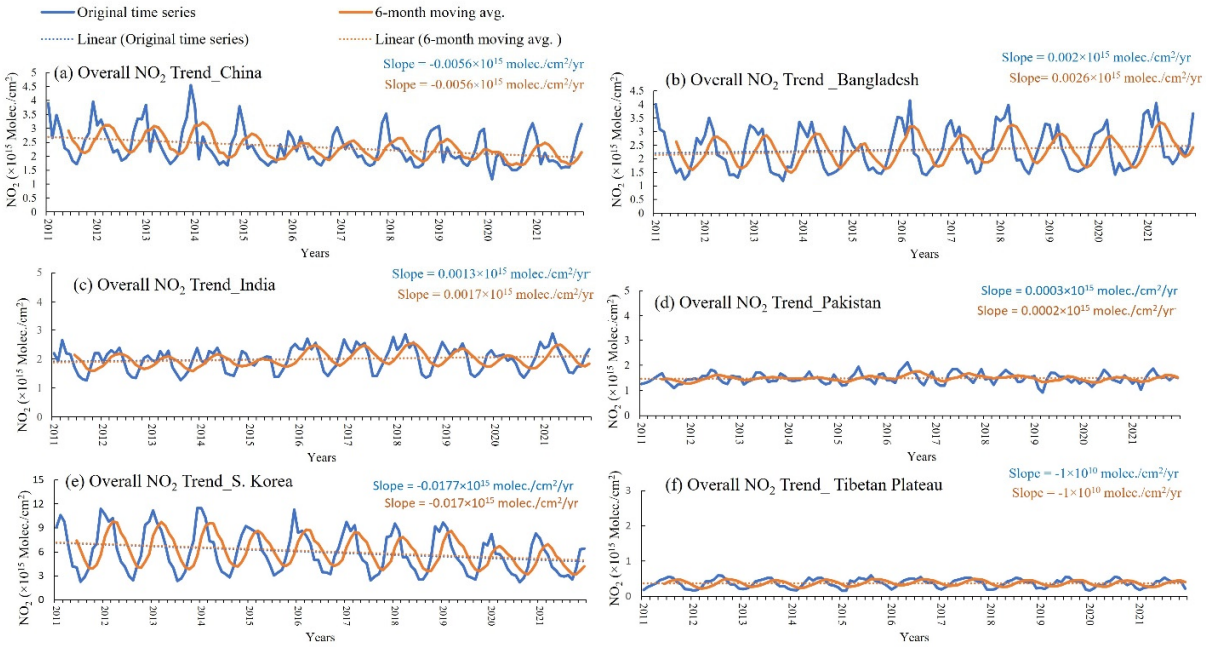

Figure S5. The overall trend of NO_2 over (a) China, (b) Bangladesh, (c) India, (d) Pakistan, (e) Republic of Korea, and (f) Tibetan Plateau.

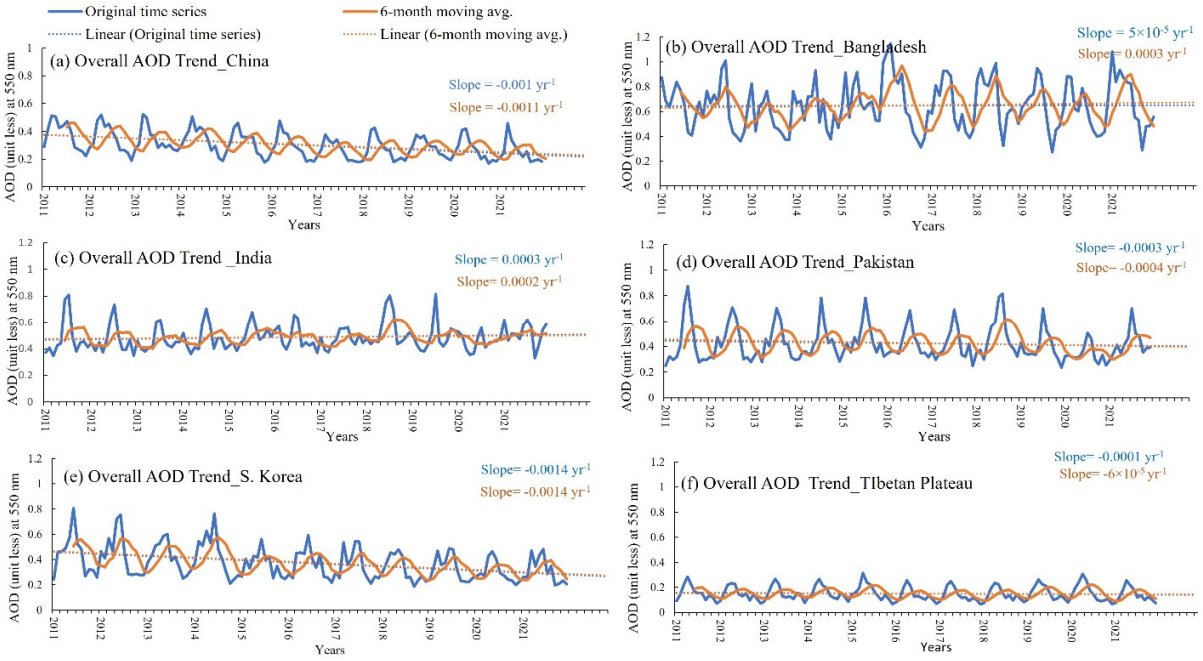

Figure S6. The overall trend of AOD over (a) China, (b) Bangladesh, (c) India, (d) Pakistan, (e) Republic of Korea, and (f) Tibetan Plateau.