

Supplementary material

Full-coverage 250 m monthly aerosol optical depth dataset (2000-2019) mended with environment variables by the ensemble machine learning model over the arid and semi-arid areas, NW China

Xiangyue Chen ¹, Hongchao Zuo ^{1,*}, Zipeng Zhang ², Xiaoyi Cao ¹, Jikai Duan ¹,
Jingzhe Wang ³, Chuanmei Zhu ², Zhe Zhang ²

1 College of Atmospheric Sciences, Lanzhou University, Lanzhou, 730000 China

2 Key Laboratory of Oasis Ecology, Xinjiang University, Xinjiang Urumqi 830046, China

3 MNR Key Laboratory for Geo-Environmental Monitoring of Great Bay Area &
Guangdong Key Laboratory of Urban Informatics & Shenzhen Key Laboratory of Spatial
Smart Sensing and Services, Shenzhen University, Shenzhen 518060, China

*Correspondence: zuohch@lzu.edu.cn; Tel.: 13119413436

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Table S1 Commonly utilized AOD satellite products sources

Sensor	Abbreviation	Platform	Launch time	Spatial resolution
The Moderate Resolution Imaging SpectroRadiometer	MODIS	Terra Aqua	2000 2002	1 km,3 km,10 km, 1°
The Multi-angle Imaging Spectroradiometer	MISR	Terra	2000	17.6 km, 0.5°
The Ozone Monitoring Instrument	OMI	Aura	2004	13×24 km ² , 1°
The Cloud-Aerosol Lidar with Orthogonal Polarization	CALIOP	CALIPSO	2006	5 km
The Advanced Himawari Imager	AHI	Himawari-8	2014	5 km
The Visible Infrared Imaging Radiometer Suite	VIIRS	Suomi-NPP	2011	6 km, 1°

Table S2 The AERONET site information

Name of site	Latitude (°N)	Longitude (°E)	Elevation (m)	Timespan
Asia1	43.783	87.650	941	200708-200708
Kashi	39.504	75.930	1304	201606-201912
Zhangye	39.079	100.276	1461	200804-200806
Dunhuang	40.038	94.794	1381	200103-200105
Dunhuang_LZU	40.492	94.955	1061	201203-201205
SACOL	35.946	104.137	1966	200607-201305
Minqin	38.607	102.959	1373	201005-201006
Mt_WLG	36.283	100.896	3816	200909-201307
Lanzhou_City	36.048	103.853	1516	200910-201003
Jingtai	37.333	104.100	1583	200802-200805
Yulin	38.283	109.717	1080	200104-200210

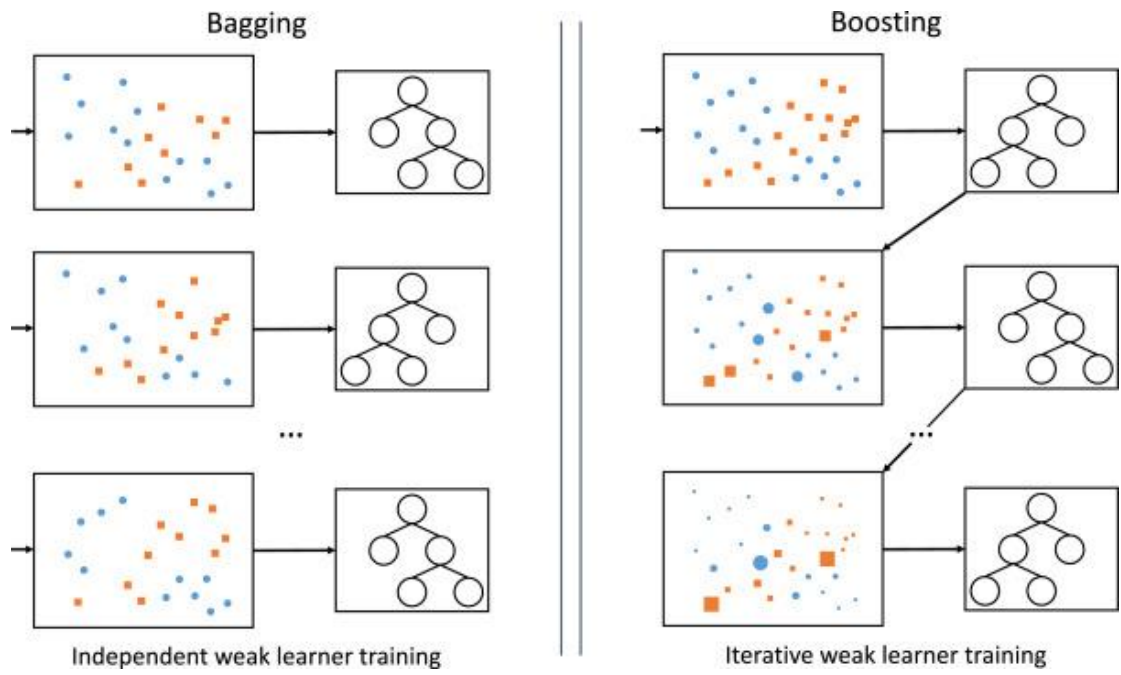


Figure S1 Representation of the workflows of Bagging and Boosting strategies.

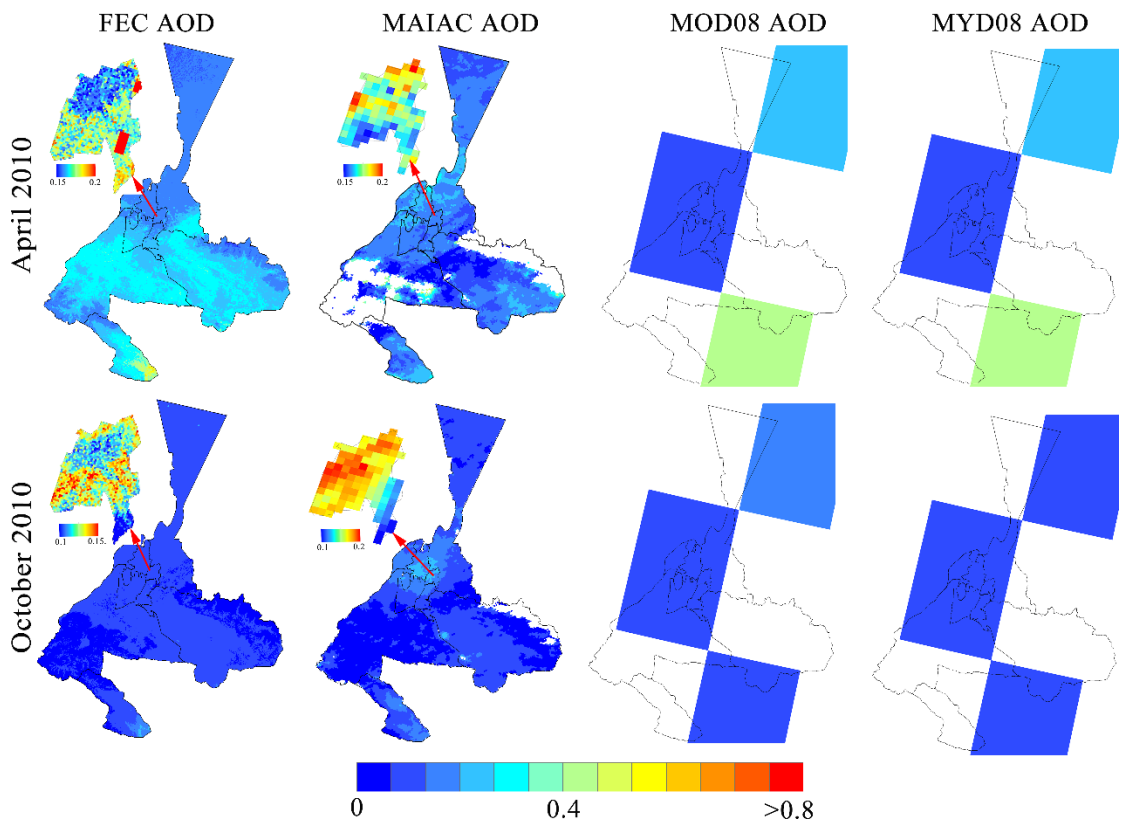


Figure S2 The spatial pattern difference of four AOD products in April 2010 and October 2011 over Urumqi.

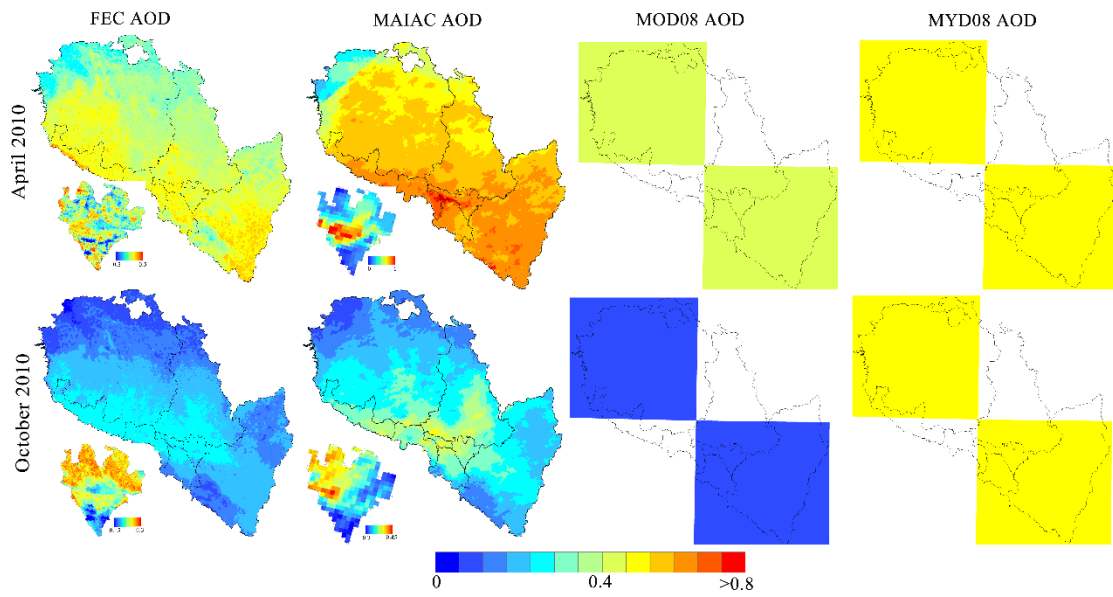


Figure S3 The spatial pattern difference of four AOD products in April 2010 and October 2011 over Lanzhou.

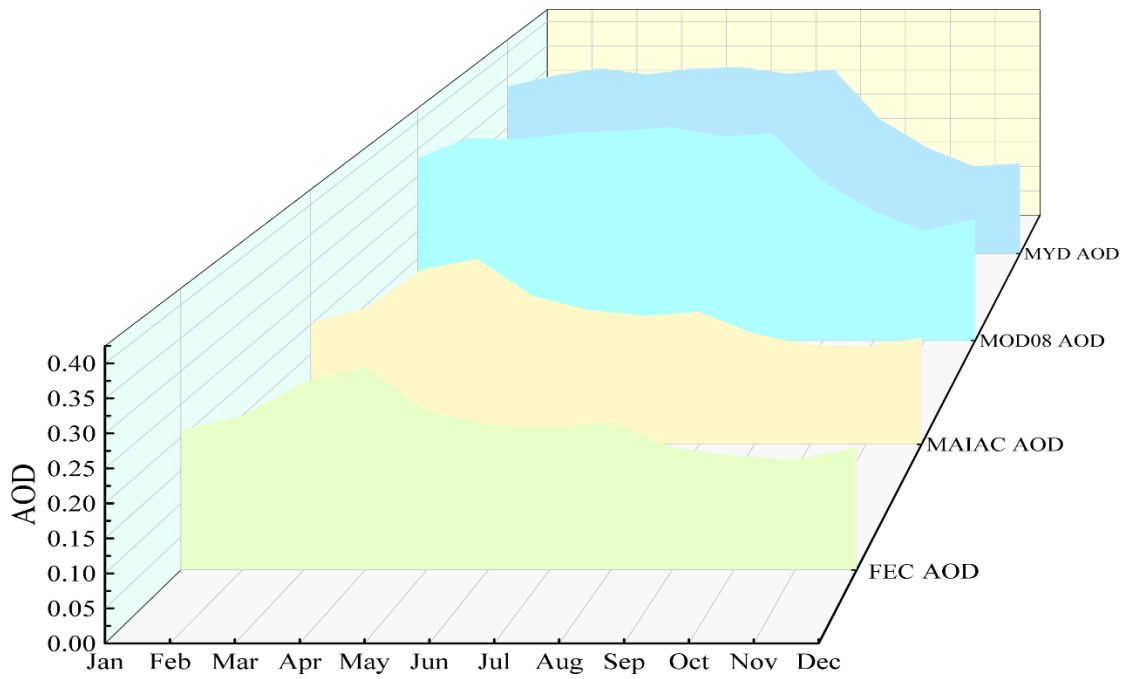


Figure S4 The multi-year monthly average AOD for four AOD products.