



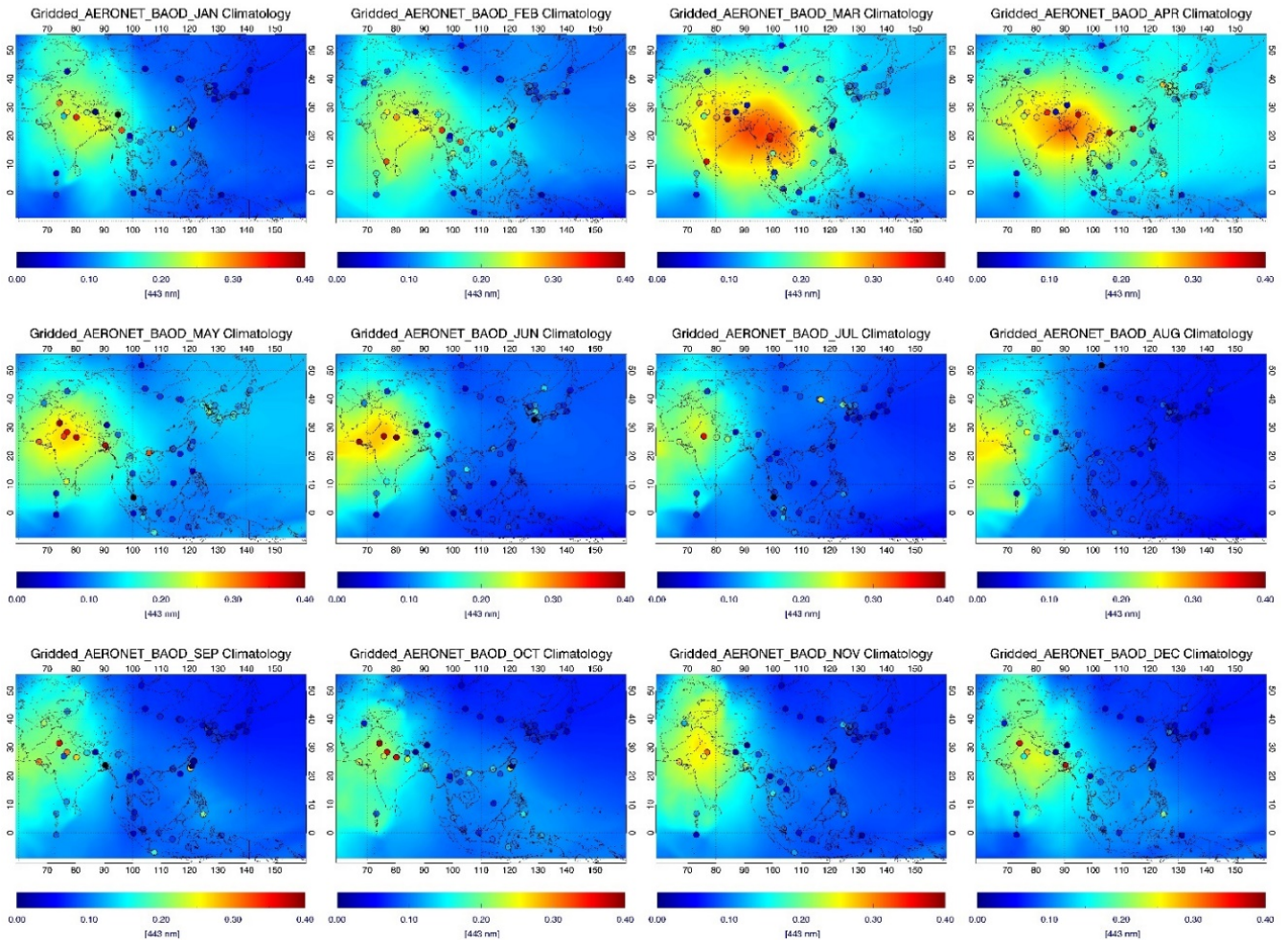
*Supplement of*

## **First atmospheric aerosol-monitoring results from the Geostationary Environment Monitoring Spectrometer (GEMS) over Asia**

**Yeseul Cho et al.**

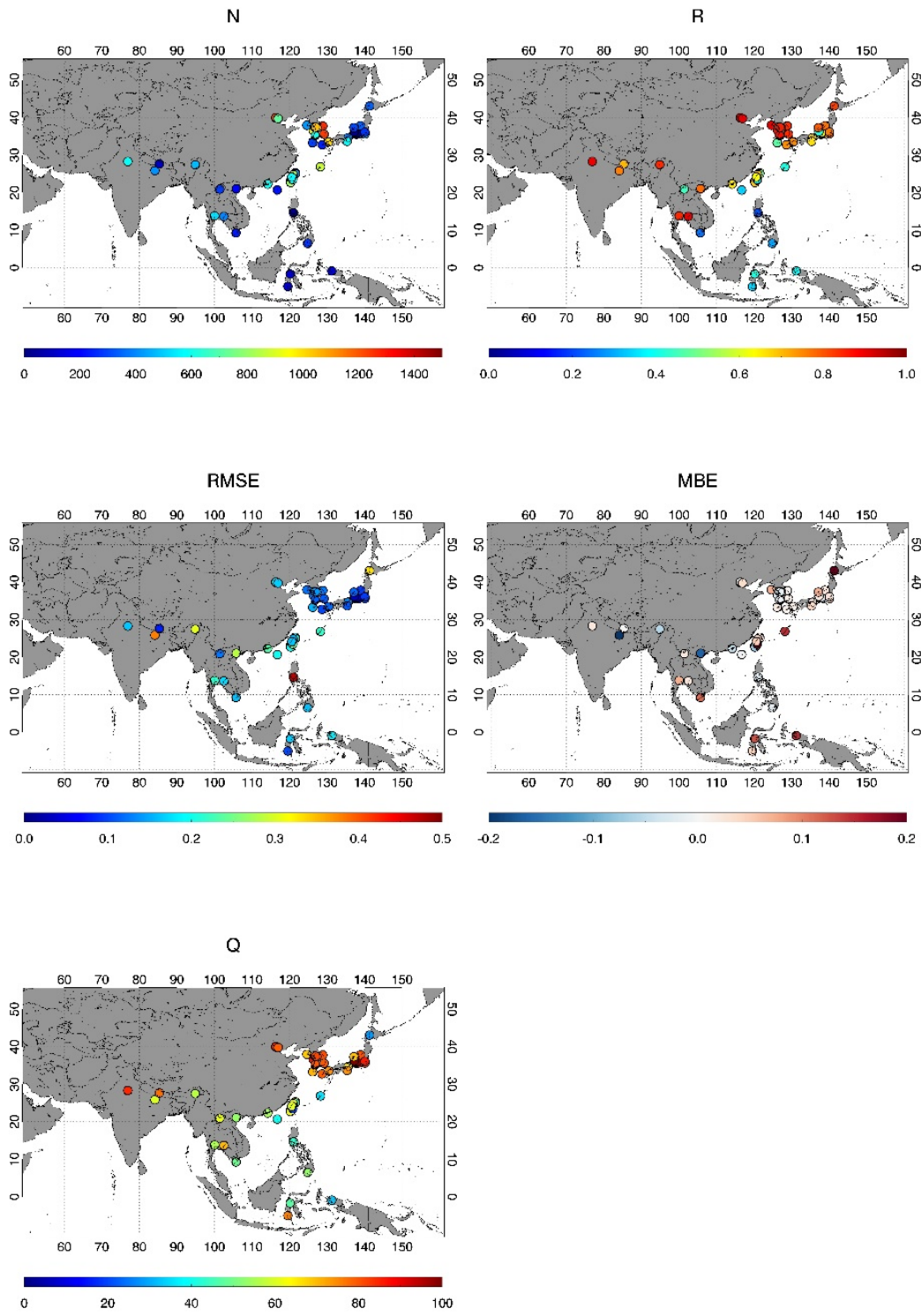
*Correspondence to:* Jhoon Kim ([jkim2@yonsei.ac.kr](mailto:jkim2@yonsei.ac.kr))

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 2 **Figure S1: Monthly BAOD at 443 nm from 2-year AERONET AOD and interpolated to a  $0.1 \times 0.1^\circ$  box. The lowest fifth**  
 3 **percentiles of the AERONET AOD 443 nm values at each AERONET site are plotted as circles for comparison.**

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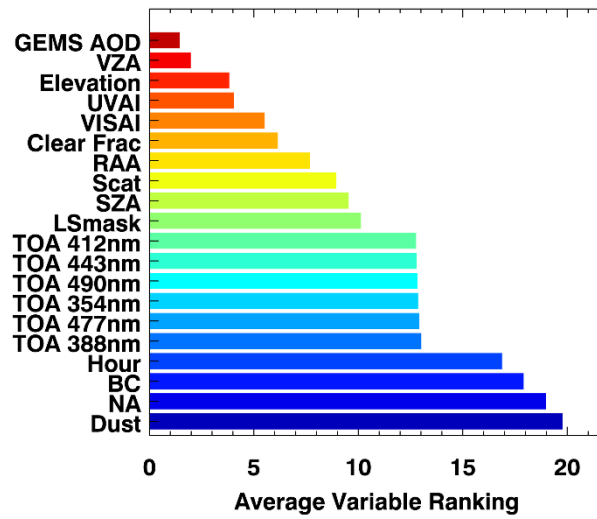


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6 **Figure S2: The statistic maps illustrating the results of site-based cross-validation for post-process corrected GEMS AOD for the 1**  
 7 **year of November 1, 2021, to October 31, 2022.**

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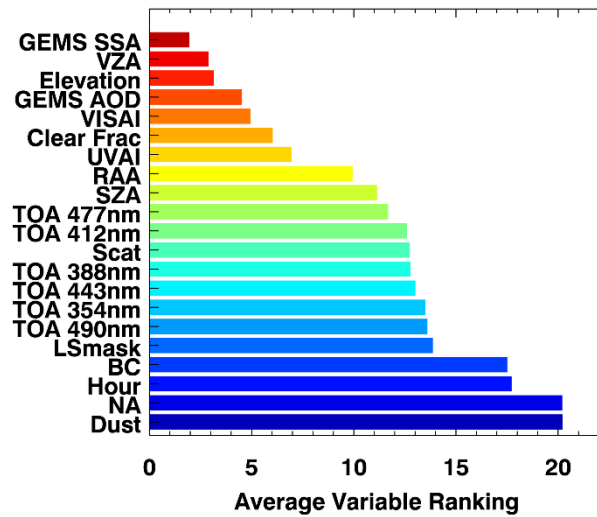


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11 **Figure S3: Average variable ranking from RF model for the post-processing correction of GEMS AOD at 443 nm for the 1 year of**  
 12 **November 1, 2021, to October 31, 2022.**

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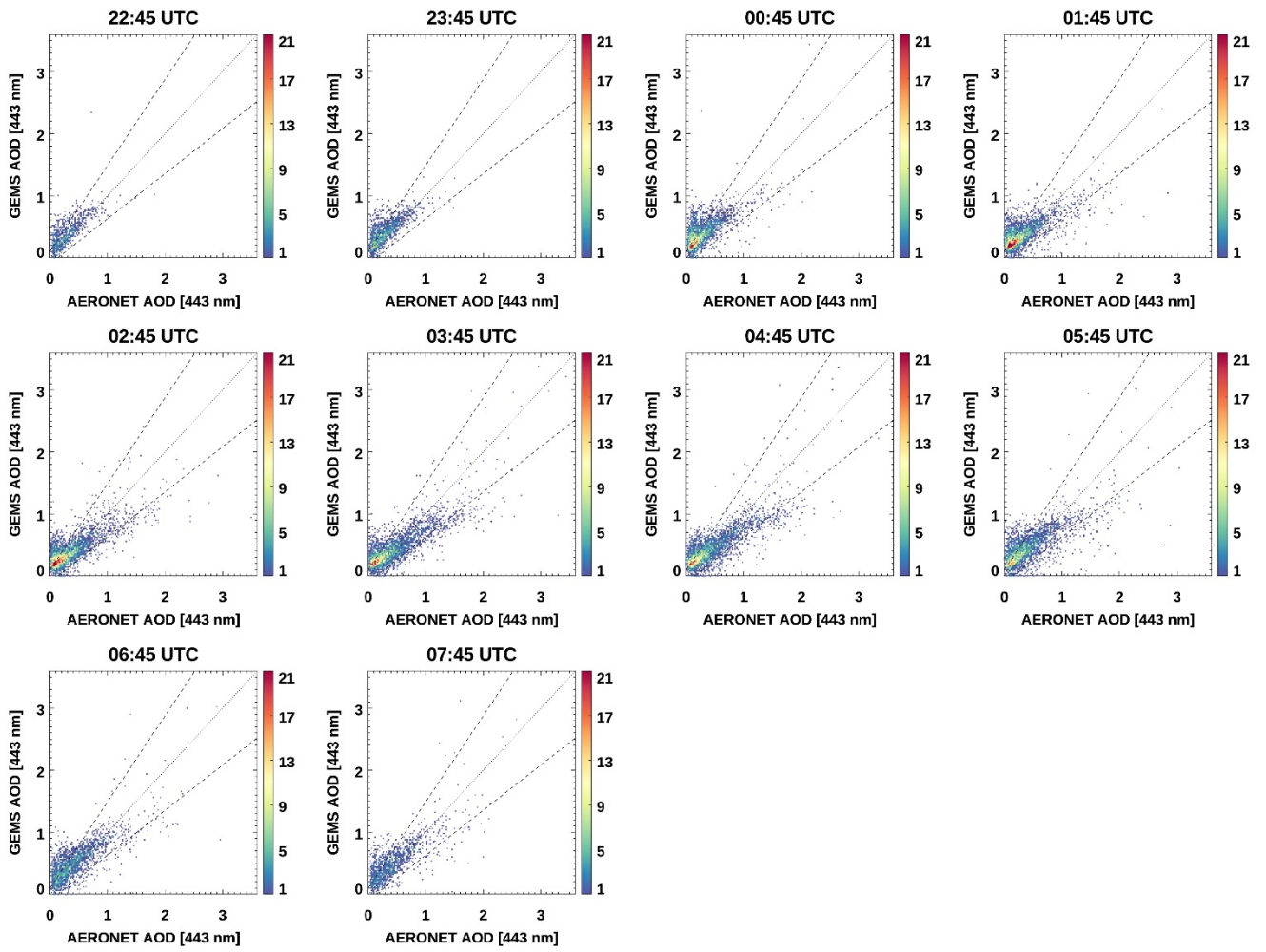
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16 **Figure S4: Average variable ranking from RF model for the post-processing correction of GEMS SSA at 443 nm for the 1 year of**  
 17 **November 1, 2021, to October 31, 2022.**

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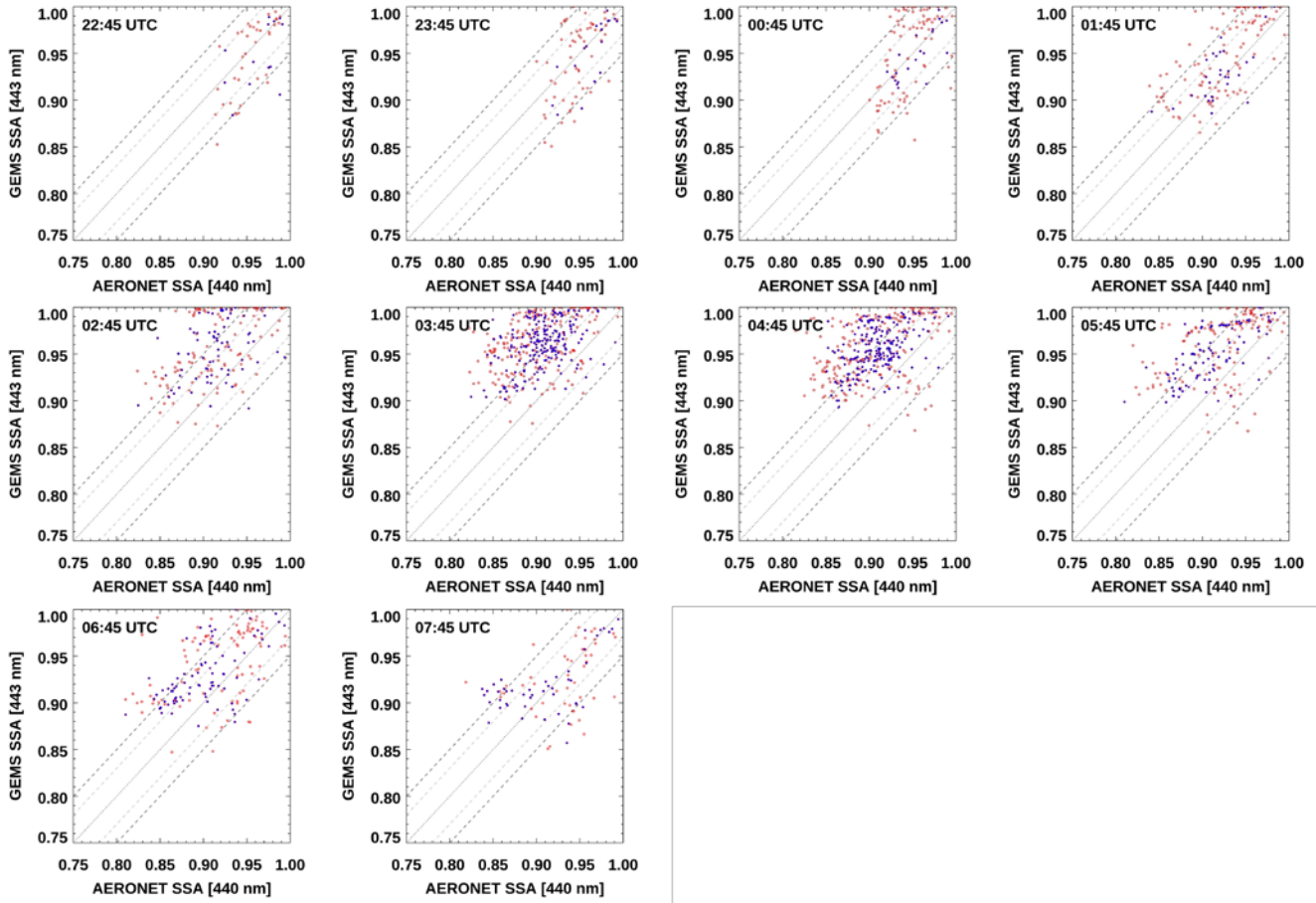
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22 **Figure S5: Hourly comparison of GEMS and AERONET AOD at 443 nm for the 1-year period of November 1, 2021, to October**  
 23 **31, 2022. The dashed lines indicate an uncertainty envelope of maximum (0.1 or 30%) in AOD. The dotted lines represent the 1:1**  
 24 **line.**

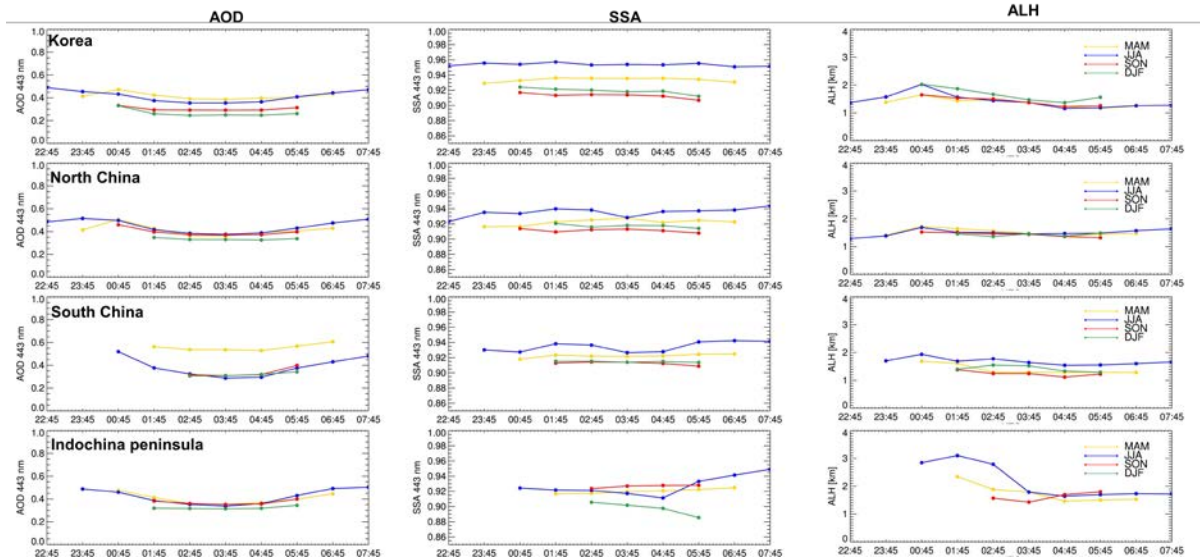
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27 **Figure S6:** Hourly comparison of GEMS and AERONET SSA for the 1 year of November 1, 2021, to October 31, 2022. The red  
 28 circles represent the pixels when AOD > 0.4, and the blue circles represent the pixels when AOD > 1.0. The gray dashed lines  
 29 indicate an uncertainty envelope of  $\pm 0.03$  in SSA, the black dashed lines indicate an uncertainty envelope of  $\pm 0.05$  in SSA, and the  
 30 dotted lines represent the 1:1 line.

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32

33 **Figure S7:** Seasonal and regional AOD, SSA, and ALH variation as a function of UTC for each of the following four regions: Korea  
 34 ( $33^{\circ}$  N– $39^{\circ}$  N and  $124^{\circ}$  E– $132^{\circ}$  E), North China ( $33^{\circ}$  N– $34^{\circ}$  N and  $110^{\circ}$  E– $124^{\circ}$  E), South China ( $21^{\circ}$  N– $33^{\circ}$  N and  $110^{\circ}$  E– $122^{\circ}$  E),  
 35 Indochina peninsula ( $8^{\circ}$  N– $22^{\circ}$  N and  $92^{\circ}$  E– $110^{\circ}$  E) during the period of November 1, 2021, to October 31, 2022. The yellow lines  
 36 represent spring MAM: March, April, and May), the blue lines represent summer (JJA: June, July, and August), and the red lines  
 37 represent autumn (SON: September, October, and November), and the green lines represent and winter (DJF: December, January,  
 38 and February).

39

40 **Table S1: Statistics of comparison of GEMS and AERONET AOD at 443 nm. The validation period is January, April, and July**  
41 **2022. Set 1 refers to the application of Section 2.1.2 to the early version of GEMS AERAOD. Set2 means applying Section 2.1.3 to**  
42 **Set1. Set 3 implies the application of Section 2.1.4 to Set 2.**

	The early version of GEMS AERAOD	Set1	Set2	Set3
N	11100	12321	10065	9874
Slope	0.462	0.735	0.656	0.664
y-intercept	0.557	0.034	0.103	0.095
R	0.511	0.754	0.740	0.768
RMSE	0466	0.274	0.262	0.249
MBE	0.369	-0.074	-0.037	-0.044
Q (%)	16.27	50.63	57.22	57.88
GCOS (%)	5.61	16.65	19.81	20.16

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