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*Supplement of*

## **Enhancements of airborne particulate arsenic over the subtropical free troposphere: impact of southern Asian biomass burning**

**Yu-Chi Lin et al.**

*Correspondence to:* Yan-Lin Zhang ([dryanlinzhang@outlook.com](mailto:dryanlinzhang@outlook.com), [zhangyanlin@nuist.edu.cn](mailto:zhangyanlin@nuist.edu.cn))

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## Supplementary Materials

This “Supplementary Materials” contains one table and five figures. Table S1 lists the average concentrations of chemical species in TSP samples observed at Mount Hehuan in different air clusters. Figure S1 plots time series of daily concentrations of airborne As, Pb and K<sup>+</sup> in TSP samples along with CO observed at Mount Hehuan from September 2011 to September 2012. Figure S2 reveals monthly distributions of MODIS fire spots observed over SE Asia and south S Asia from September 2011 to September 2012. Figure S3 shows five-day backward trajectories observed at Mount Hehuan in different BB cases. Figure S4 five-day backward trajectory at Mount Hehuan from (a) March 25 to April 3, 2012 and (b) March 9 to 15, 2012. Figure S5 illustrates the scattered plots of As against Al observed at Mount Hehuan in (a)SA, (b)SEA and (c)other air groups during the S and SE Asian biomass burning seasons.

Table S1 The average concentrations of chemical species in TSP samples observed at Mount Hehuan in different air clusters. The units of all species are in  $\text{ng m}^{-3}$ .

	NC	PO	SS	SEA	SA
Al	178.9	145.0	53.6	145.9	295.8
Fe	117.8	82.2	37.0	94.6	203.5
Na	89.9	62.1	49.1	88.1	116.1
Mg	46.4	20.1	13.7	35.8	94.4
K	136.8	87.0	49.3	147.4	223.6
Ca	139.1	77.6	43.8	86.3	252.9
Sr	1.0	0.5	0.3	0.7	2.3
Ba	2.5	2.0	1.0	1.7	3.0
Ti	11.4	7.2	3.6	9.3	20.6
Mn	4.7	2.1	1.1	3.0	6.4
Co	0.1	0.1	0.0	0.0	0.1
Ni	0.6	0.6	0.2	0.4	0.6
Cu	27.0	15.6	20.0	21.8	20.9
Zn	18.2	12.3	6.1	8.2	13.0
Mo	0.1	0.1	0.0	0.1	0.1
Cd	0.2	0.0	0.0	0.1	0.3
Sn	0.6	0.2	0.1	0.3	0.5
Sb	0.3	0.1	0.1	0.2	0.3
Tl	0.0	0.0	0.0	0.0	0.0
Pb	5.0	1.1	0.8	2.8	7.7
V	0.6	0.3	0.2	0.6	0.8
Cr	0.9	0.9	0.5	0.5	1.0
As	0.6	0.1	0.1	0.4	1.2
Se	0.2	0.0	0.0	0.1	0.1
Ge	0.0	0.0	0.0	0.0	0.0
Rb	0.6	0.3	0.2	0.5	1.0
Cs	0.0	0.0	0.0	0.0	0.1
Ga	0.2	0.1	0.0	0.1	0.2
La	0.1	0.1	0.0	0.1	0.2
Ce	0.2	0.2	0.1	0.2	0.4
Nd	0.1	0.1	0.0	0.1	0.2
P	51.4	32.8	28.8	32.6	29.9
NH <sub>4</sub> <sup>+</sup>	659.3	53.5	143.9	663.0	1064.5
K <sup>+</sup>	71.2	4.5	24.5	116.6	198.8
F <sup>-</sup>	14.8	2.6	6.7	27.6	36.4
Cl <sup>-</sup>	84.4	16.9	79.7	126.2	163.0
SO <sub>4</sub> <sup>2-</sup>	1935.5	141.2	328.4	1486.7	3049.0
NO <sub>3</sub> <sup>-</sup>	490.4	48.9	188.1	882.7	1212.9

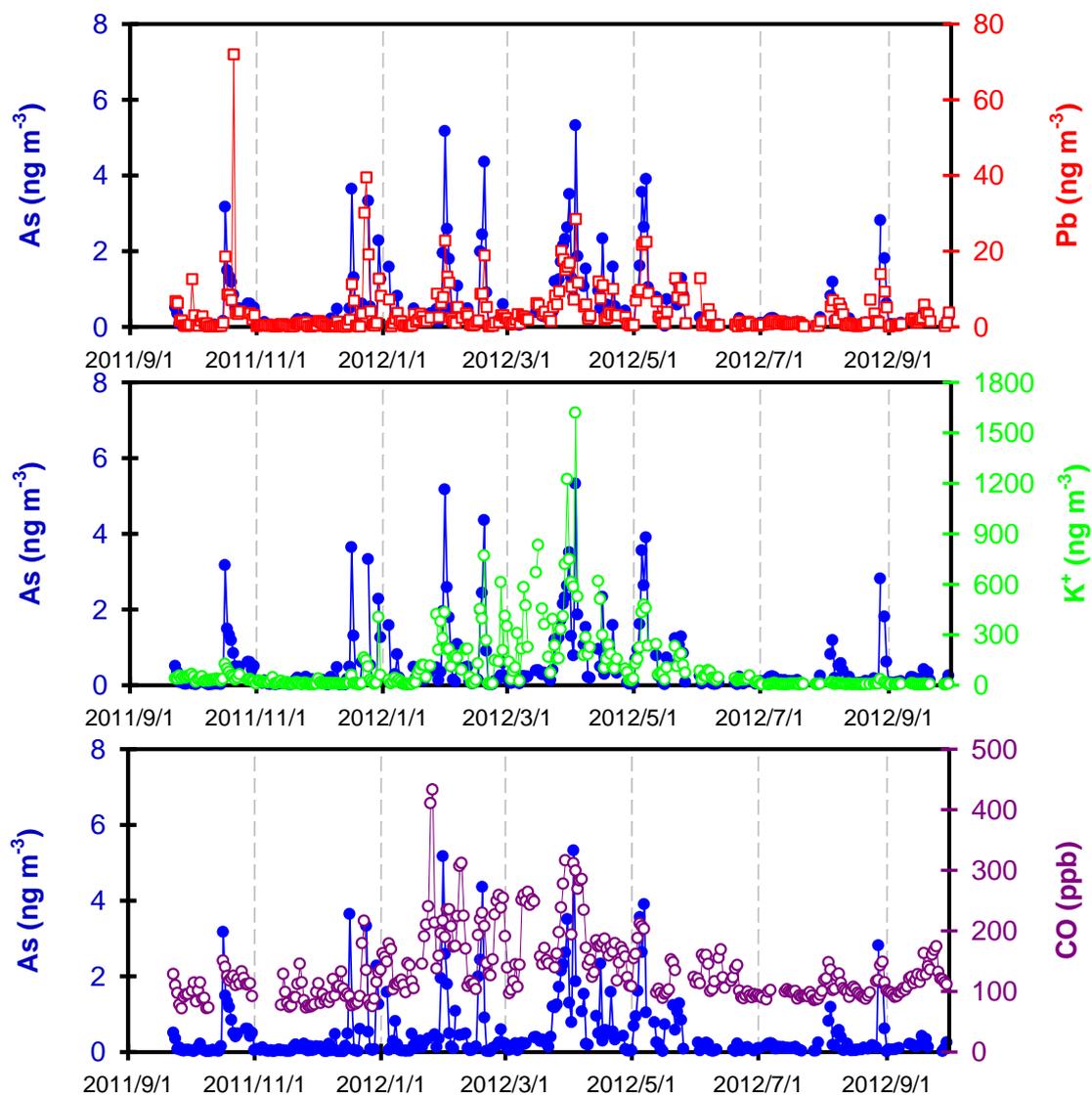


Figure S1 Time series of daily concentrations of airborne As, Pb and K<sup>+</sup> in TSP samples along with CO observed at Mount Hehuan from September 2011 to September 2012.

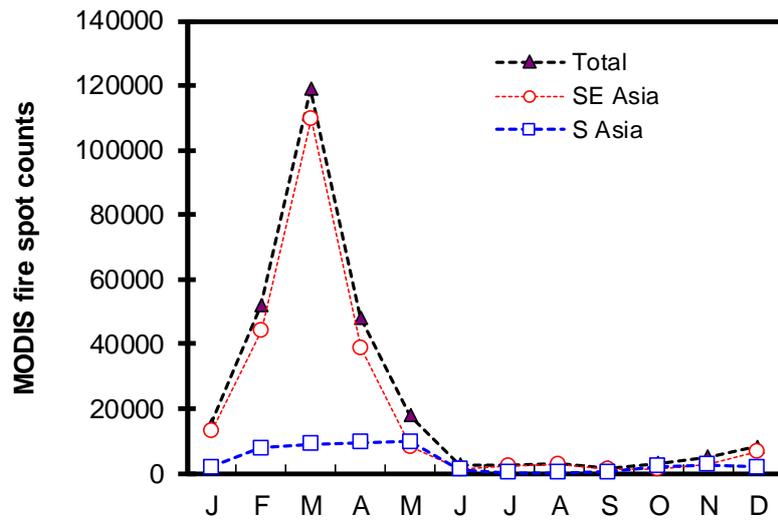


Figure S2 Monthly distributions of MODIS fire spots observed over SE and S Asia. The total fire spots in the figure means the summation of fire spots observed over SE and S Asia. The SE Asia region is identified the mainland Southeast Asian peninsula ranging from 5 to 30 °N and 90 to 110 °E; The S Asia region identified the Indian subcontinent ranging from 5 to 38 °N and 65 to 90 °E.

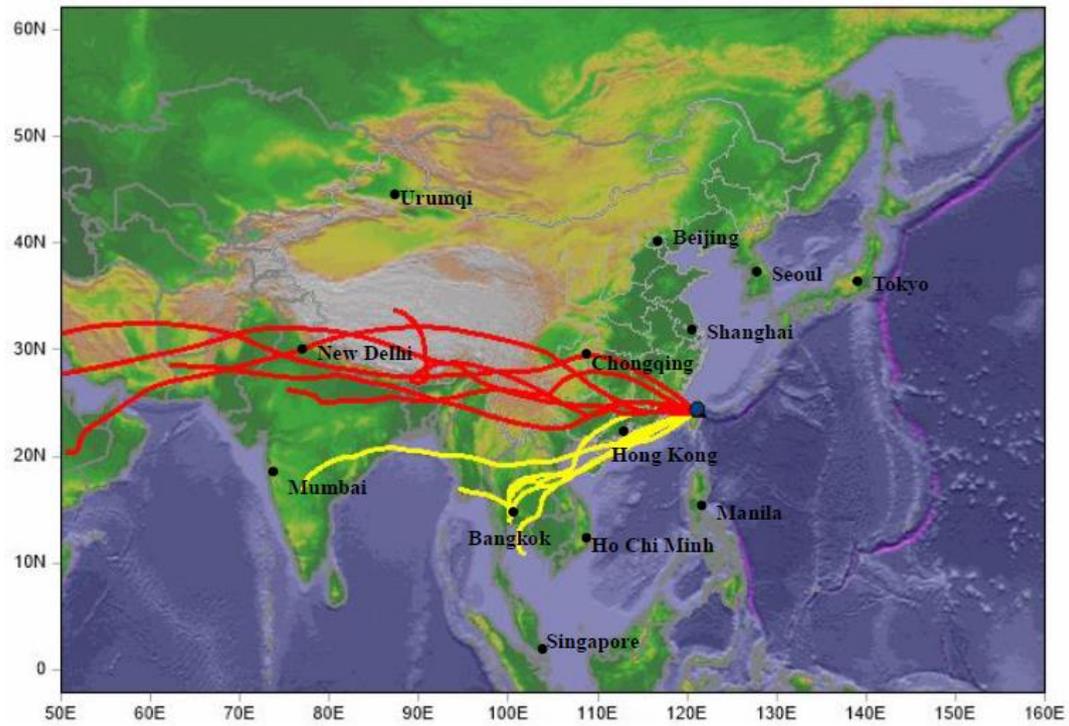
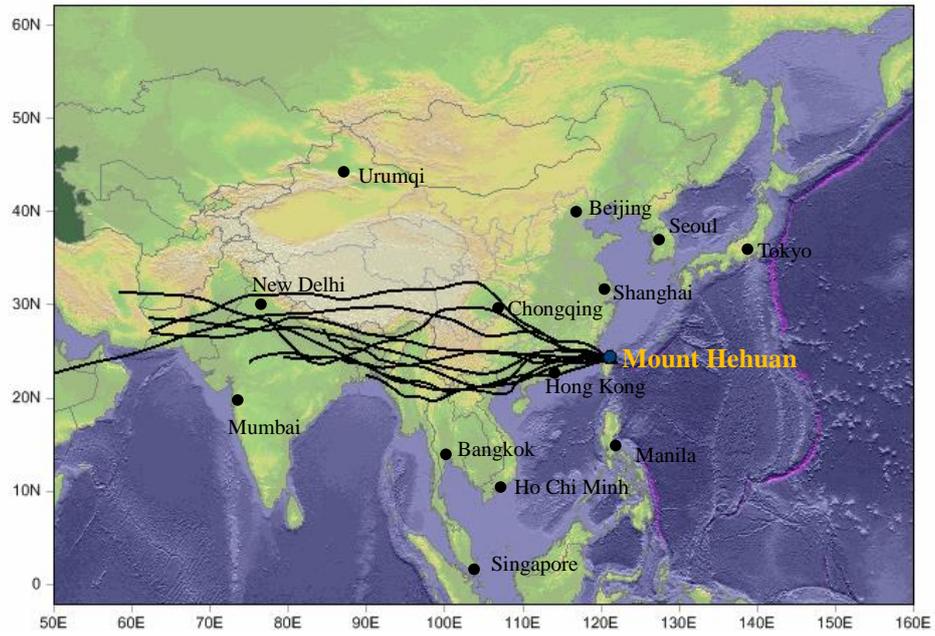


Figure S3 Five-day backward trajectories observed at Mount Hehuan in different BB cases. The trajectories were computed at 12:00 LT (local time) once every day with a time step of 6 hours. The red lines denote the air parcels on Feb. 19, Mar. 30, Mar. 31, Apr. 3, May 5 and 7, 2012 (with high As plumes). The yellow ones represent the air masses from Feb. 25 to 28 and March 15, 2012 (with low As concentrations).

(a)



(b)

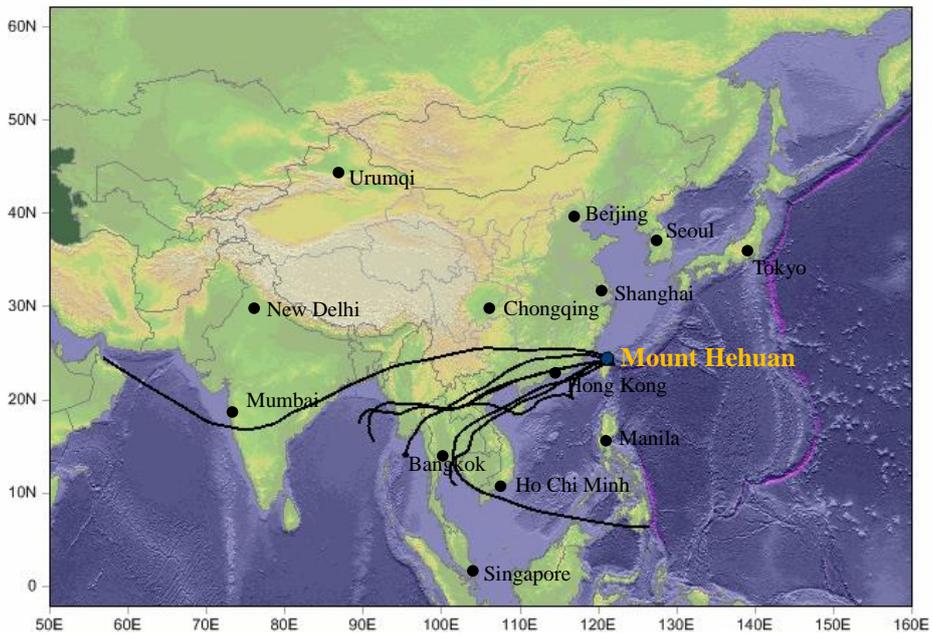


Figure S4 Five-day backward trajectory at Mount Hehuan from (a) March 25 to April 3, 2012 and (b) March 9 to 15, 2012. The trajectories were computed at 12:00 LT (local time) once every day with a time step of 6 hours.

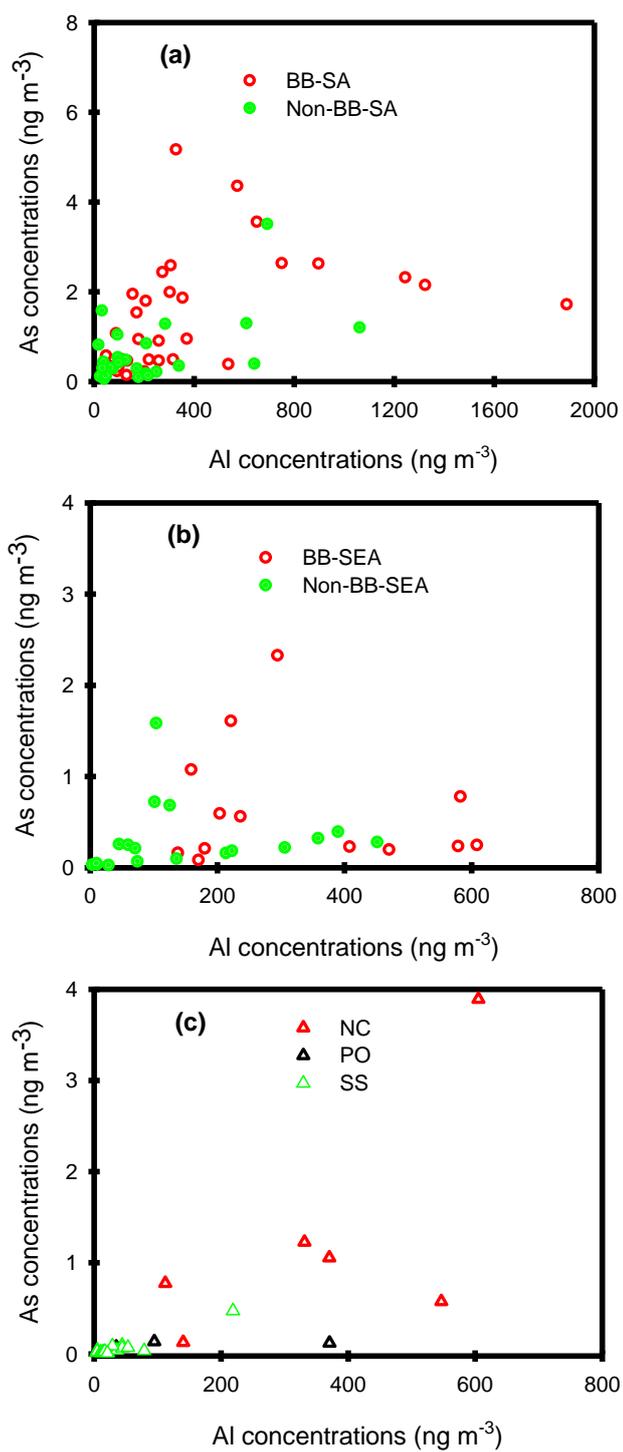


Figure S5 The scattered plots of As against Al observed at Mount Hehuan in (a)SA, (b)SEA and (c)other air groups during the S and SE Asian biomass burning seasons (January to May, 2012).