

Supplement of Atmos. Chem. Phys., 17, 9311–9332, 2017
<https://doi.org/10.5194/acp-17-9311-2017-supplement>
© Author(s) 2017. This work is distributed under
the Creative Commons Attribution 3.0 License.



Supplement of

On the multiday haze in the Asian continental outflow: the important role of synoptic conditions combined with regional and local sources

Jihoon Seo et al.

Correspondence to: Jin Young Kim (jykim@kist.re.kr)

The copyright of individual parts of the supplement might differ from the CC BY 3.0 License.

Table S1: The average and standard deviation of PM_{2.5} non-sea salt (nss-) ions and sea salt in Seoul and Deokjeok for the haze (February 23–28, 2014) and clean (March 5–9, 2014) periods.

Components	Seoul		Deokjeok	
	Haze	Clean	Haze	Clean
nss-SO ₄ ²⁻ (μg m ⁻³)	34.9 ± 9.1	3.9 ± 1.4	29.2 ± 12.3	4.7 ± 2.6
NO ₃ ⁻ (μg m ⁻³)	32.8 ± 8.4	4.6 ± 4.2	11.4 ± 8.5	2.8 ± 3.0
nss-Cl ⁻ (μg m ⁻³)	0.9 ± 0.4	0.2 ± 0.2	0.4 ± 0.5	-0.1 ± 0.1
NH ₄ ⁺ (μg m ⁻³)	21.6 ± 4.3	2.7 ± 1.6	14.4 ± 6.0	2.4 ± 1.8
nss-K ⁺ (μg m ⁻³)	0.9 ± 0.2	0.2 ± 0.1	0.7 ± 0.3	0.2 ± 0.1
nss-Ca ²⁺ (μg m ⁻³)	0.3 ± 0.1	0.1 ± 0.0	0.2 ± 0.1	0.1 ± 0.0
nss-Mg ²⁺ (μg m ⁻³)	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.0	0.1 ± 0.1
Sea salt (μg m ⁻³)	0.4 ± 0.1	0.2 ± 0.1	0.5 ± 0.2	0.5 ± 0.3

Sea salt estimated by known mass ratio of ions to Na⁺ in seawater (0.25 for SO₄²⁻, 0.037 for K⁺, 0.038 for Ca²⁺, and 0.12 for Mg²⁺; Berg and Winchester, 1978). Non-sea salt (nss-) ionic components were estimated by a simple calculation, which assumes that the sea salt contributes Na⁺ in PM_{2.5} alone (George et al., 2008), as follows:

$$M_{\text{nss-X}} = M_X - (X/\text{Na}^+)_{\text{sw}} \times M_{\text{Na}}$$

where, M_X is the total mass of a species X, $(X/\text{Na}^+)_{\text{sw}}$ is a mass ratio of X to Na⁺ in seawater, M_{Na} is the mass of Na⁺, and $M_{\text{nss-X}}$ is the mass of the nss- component in M_X .

References

- Berg Jr, W. W. and Winchester, J. W.: Aerosol chemistry of marine atmosphere, *Chem. Oceanogr.*, 7, 173–231, 1978.
- George, S. K., Nair, P. R., Parameswaran, K., Jacob, S., and Abraham, A.: Seasonal trends in chemical composition of aerosols at a tropical coastal site of India, *J. Geophys. Res.*, 113, D16209, 2008.

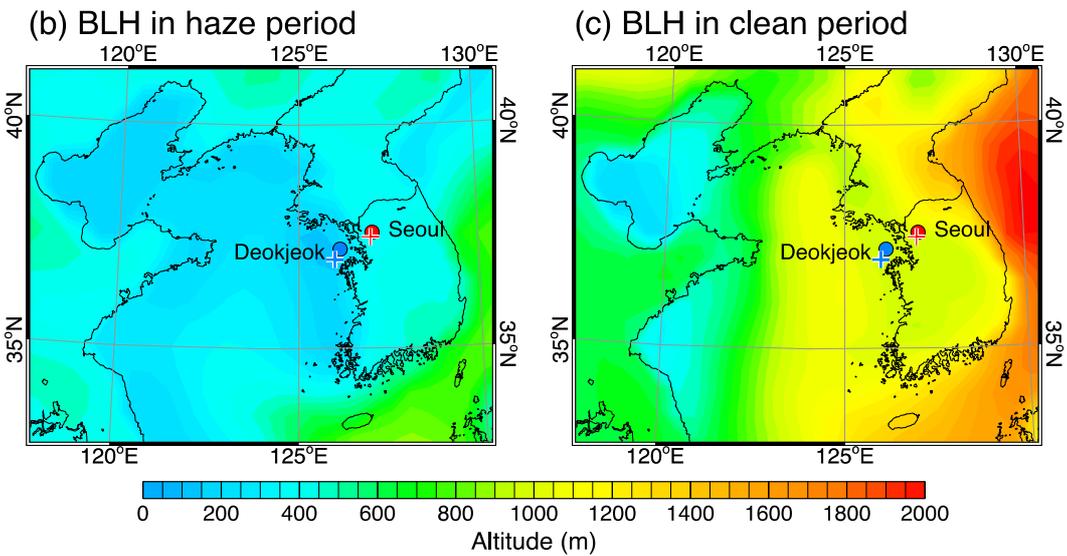
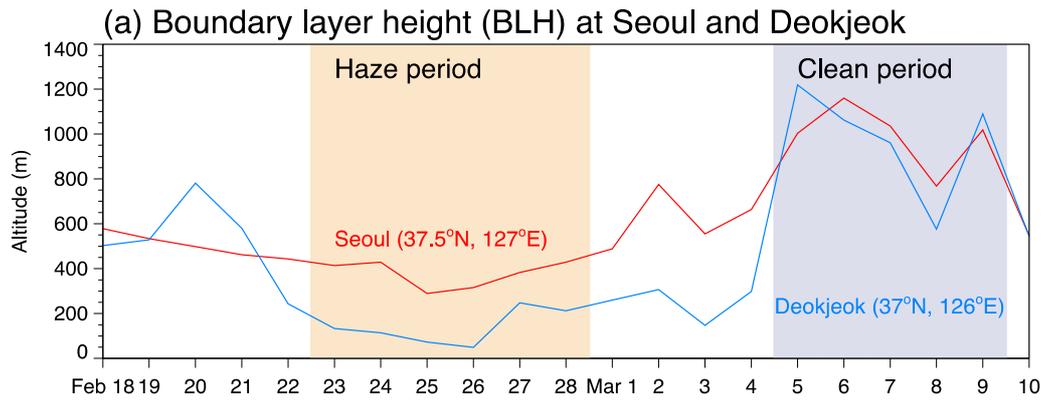


Figure S1: Boundary layer height (BLH) from ERA-Interim reanalysis data. (a) Time series of BLH near Seoul (37.5°N, 127.0°E) and Deokjeok (37.0°N, 126.0°E). (b and c) Spatial distribution of BLH averaged for (b) haze period (February 23–28) and (c) clean period (March 5–9). Filled circles and plus symbols indicate locations of the measurement site and nearest ERA-interim grid points from the sites, respectively.

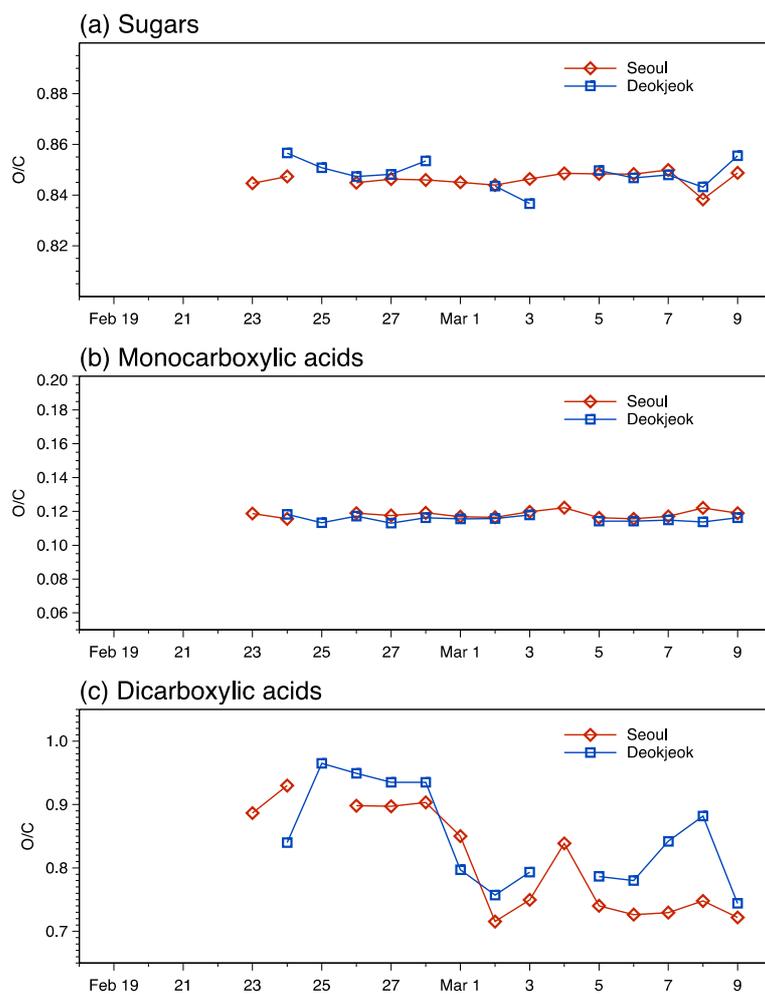


Figure S2: Daily time-series of O/C of (a) sugars, (b) monocarboxylic acids, and (c) dicarboxylic acids at KIST site in Seoul and Deokjeok site for the analysis period.