Molecular characterization of organic aerosols in the Kathmandu Valley, Nepal: insights into primary and secondary sources

Xin Wan[1,8] Shichang Kang[2,7], Maheswar Rupakheti[3,4], Qianggong Zhang[1,7], Lekhendra Tripathee[2], Junming Guo[2], Pengfei Chen[2], Dipesh Rupakheti[2], Arnico K. Panday[5], Mark G. Lawrence[3], Kimitaka Kawamura[6], Zhiyuan Cong[1,7*]

[1] Key Laboratory of Tibetan Environment Changes and Land Surface Processes, Institute of Tibetan Plateau Research, Chinese Academy of Sciences (CAS), Beijing 100101, China

[2] State Key Laboratory of Cryospheric Science, Northwest Institute of Eco-Environment and Resources, CAS, Lanzhou 730000, China

[3] Institute for Advanced Sustainability Studies (IASS), Potsdam 14467, Germany

[4] Himalayan Sustainability Institute (HIMSI), Kathmandu, Nepal

[5] International Centre for Integrated Mountain Development (ICIMOD), Khumaltar, Lalitpur, Nepal

[6] Chubu Institute for Advanced Studies, Chubu University, Kasugai 487-8501, Japan

[7] CAS Center for Excellence in Tibetan Plateau Earth Sciences, Beijing 100101, China

[8] University of Chinese Academy of Sciences, Beijing 100039, China

*Corresponding author:

E-mail address: zhiyuancong@itpcas.ac.cn

Supporting Information

Table S1 Recoveries and MDLs of the target compounds

Compounds	Addition (ppb) (n=6)	Recovery (%)	MDLs (ng m^{-3})
Levoglucosan	100	81.6 ± 10.4	0.08
Mannosan	100	80.7 ± 11.7	0.07
Galactosan	100	76.3 ± 9.43	0.07
p-Hydroxybenzoic acid	100	80.8 ± 9.78	0.07
Vanillic acid	100	79.4 ± 11.5	0.11
Syringic acid	100	78.6 ± 14.2	0.11
Dehydroabietic acid	100	85.4 ± 13.4	0.11
Glucose	100	86.2 ± 13.2	0.05
Fructose	100	86.5 ± 9.57	0.06
Trehalose	100	80.9 ± 10.4	0.13
Sucrose	100	82.2 ± 12.6	0.08
Xylose	100	81.7 ± 10.1	0.09
Mannitol	100	80.6 ± 7.25	0.12
Arabitol	100	85.8 ± 8.57	0.06
Sorbitol	100	77.5 ± 11.1	0.12
Erythtitol	100	90.8 ± 3.80	0.07
Diethyl	100	87.7 ± 10.0	0.12
Di-n-butyl	100	89.5 ± 11.5	0.12
Bis-(2-ethylhexy)	100	89.9 ± 5.36	0.12
Malic acid	100	76.4 ± 5.44	0.13
Pinic acid	100	76.1 ± 7.85	0.10
cis-Pinonic acid	100	73.9 ± 5.00	0.08
Azelaic acid	100	87.2 ± 6.77	0.11
Methyl-β-D-xylanopyranoside	100	90.1 ± 13.2	
D_3-malic acid	100	70.5 ± 14.6	

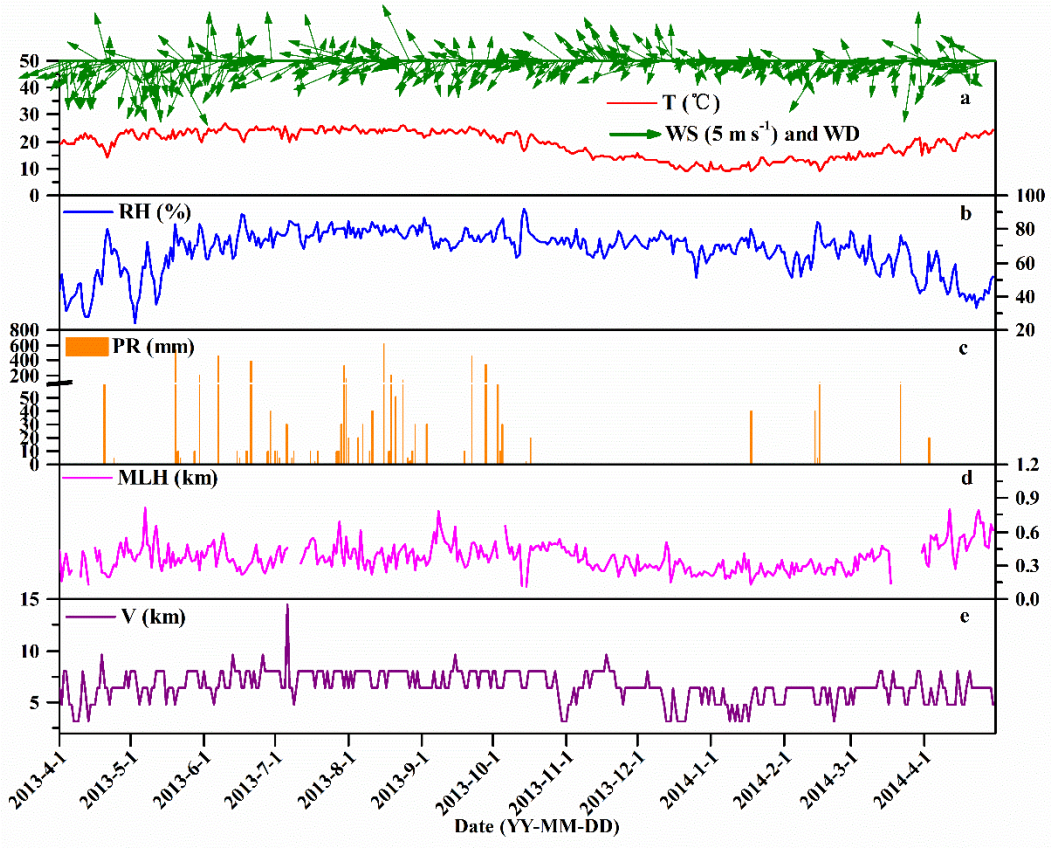
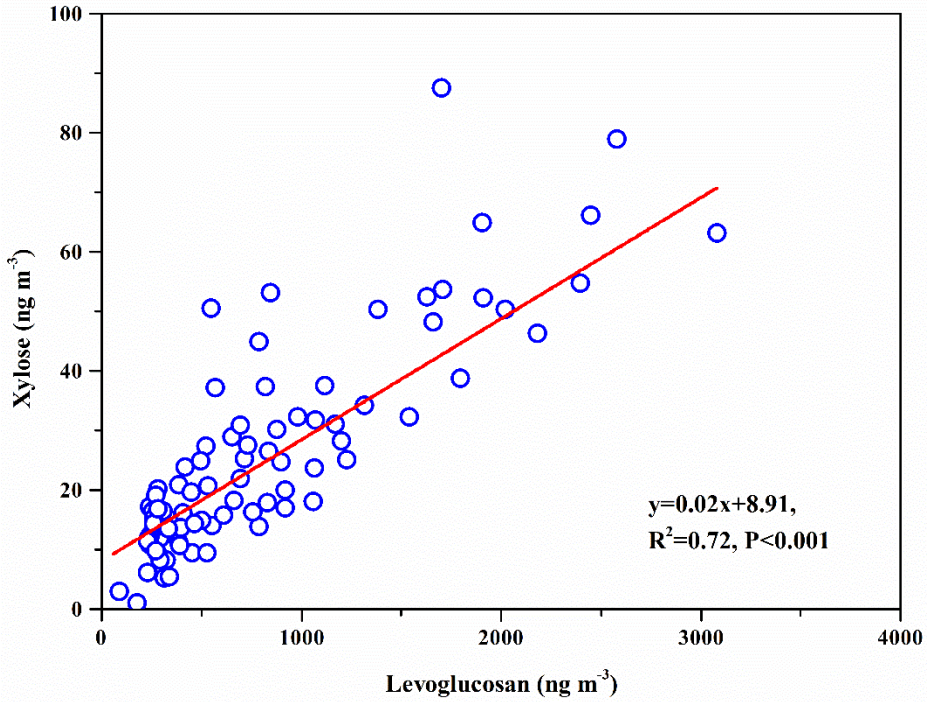


Fig. S1. Temporal variations of (a) wind speed (WS), wind direction (WD), temperature (T), (b) relative humidity (RH), (c) precipitation (PR), and (e) visibility (V) monitored at Tribhuvan International Airport and (d) mixing layer height (MLH) from Vaisala ceilometer at Bode site, Kathmandu Valley from April 2013 to April 2014.



29

30 **Fig. S2.** Correlations between levoglucosan and xylose during the sampling period (April 2013 to April

31 2014).

32

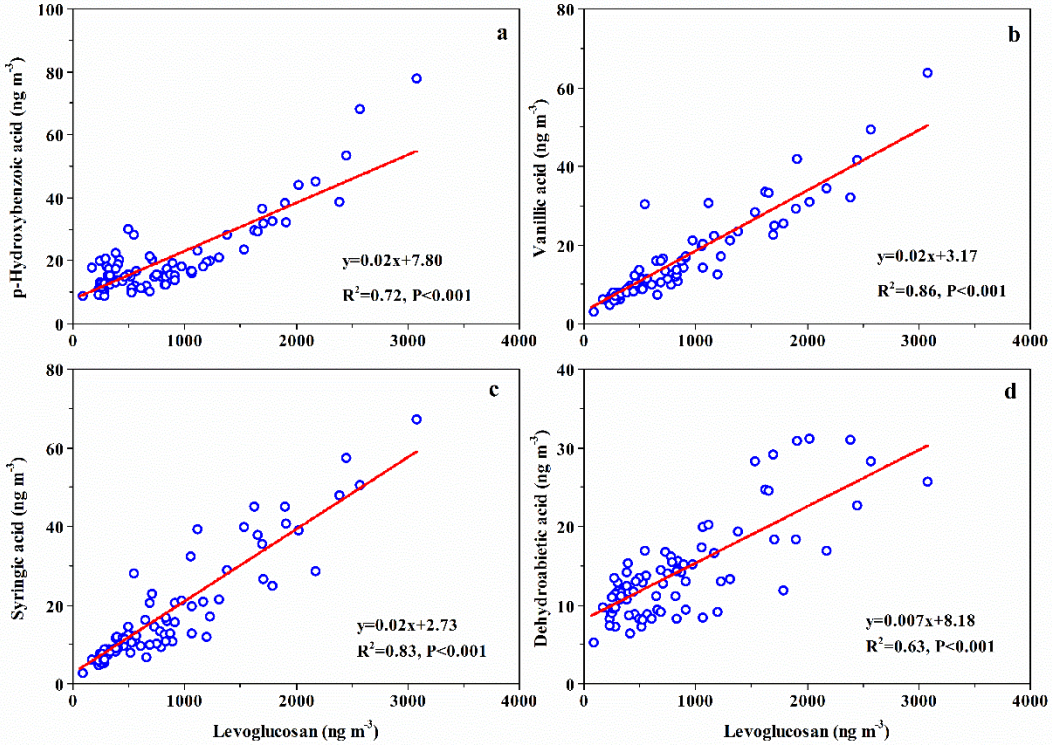
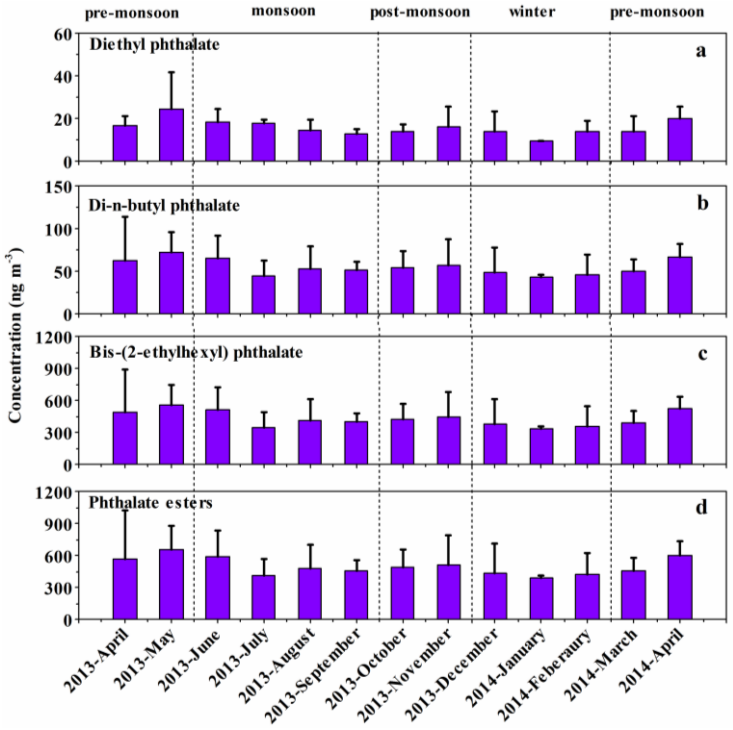


Fig. S3. Correlations between (a) levoglucosan and p-hydroxybenzoic acid, (b) levoglucosan and vanillic acid, (c) levoglucosan and syringic acid, (d) levoglucosan and dehydroabietic acid in Bode aerosols during the whole year (April 2013 to April 2014).



38

39 **Fig. S4.** Monthly variations of phthalate esters at Bode site, Kathmandu Valley during April 2013-April

40 2014.

41

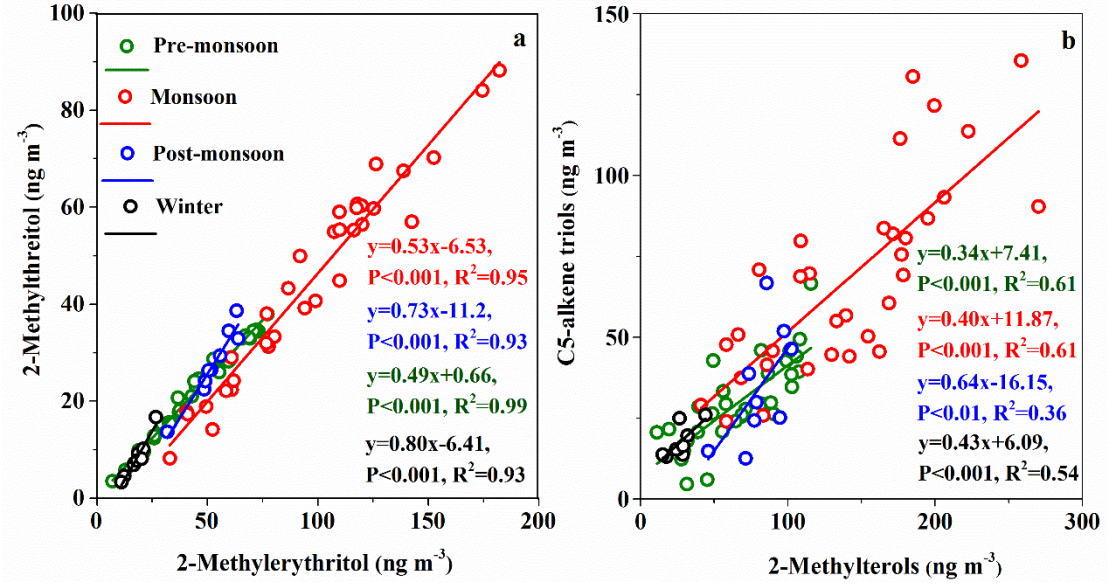
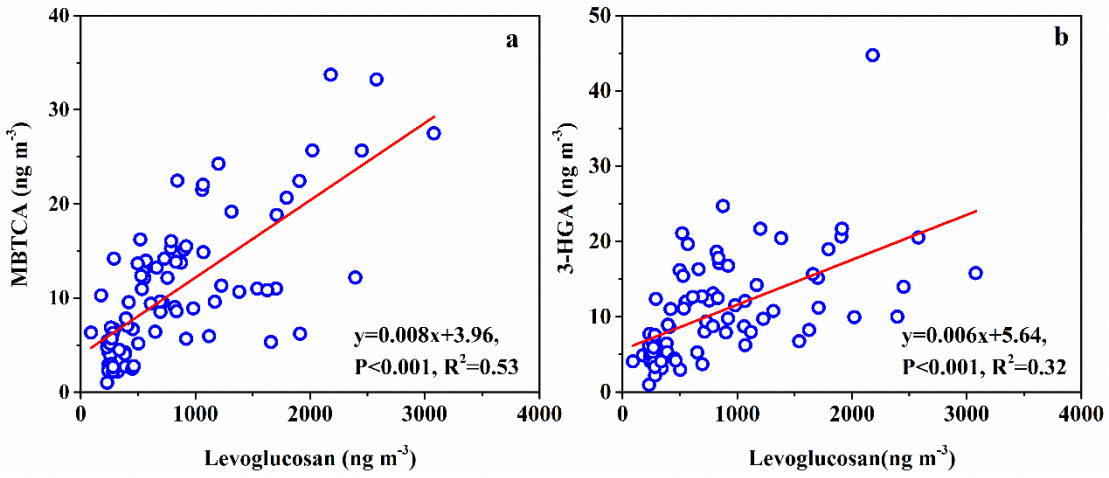


Fig. S5. Correlations between (a) 2-methylthreitol and 2-methylerythritol, (b) C5-alkene triols and 2-methylterols in Bode aerosols during the sampling period (April 2013 to April 2014).



45

46 **Fig. S6.** Correlations between (a) MBTCA and levoglucosan, (b) 3-HGA and levoglucosan in Bode

47 aerosols during the sampling period (April 2013 to April 2014).