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Supplement of

Brief communication: Spatial and temporal variations in surface snow chemistry along a traverse from coastal East Antarctica to the ice sheet summit (Dome A)

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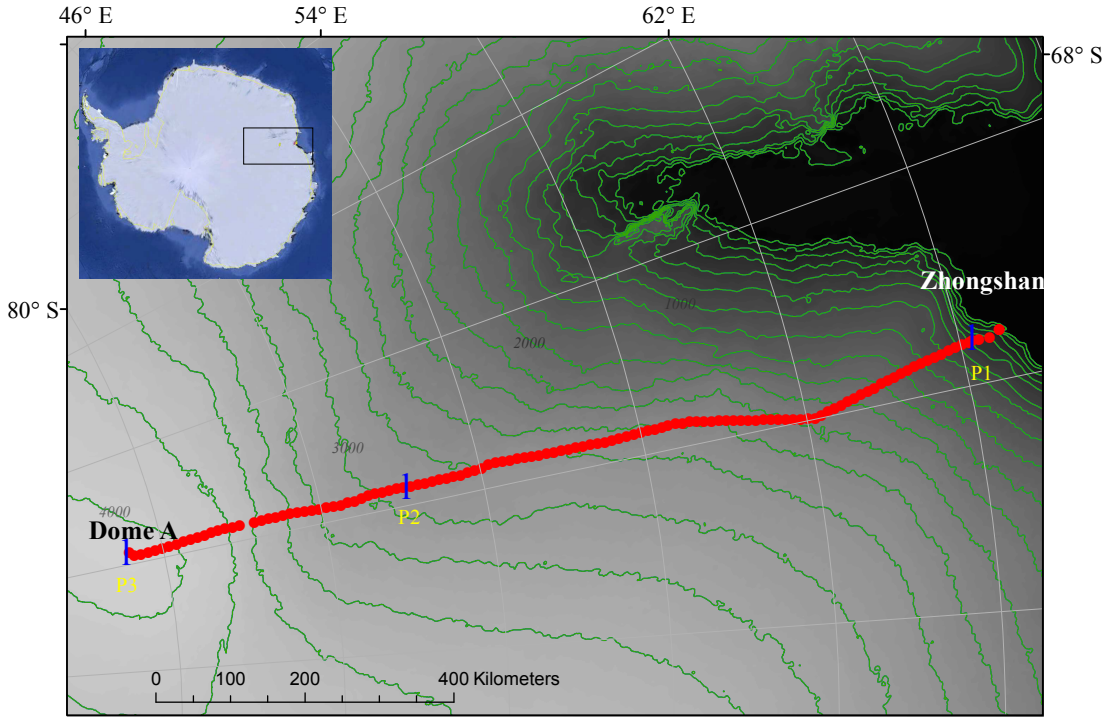

Figure S1. The Chinese inland investigation traverse from the coast (Zhongshan Station) to the ice sheet summit, Dome A, East Antarctica. The traverse is generally along the 77.0 ^{o}E longitude.

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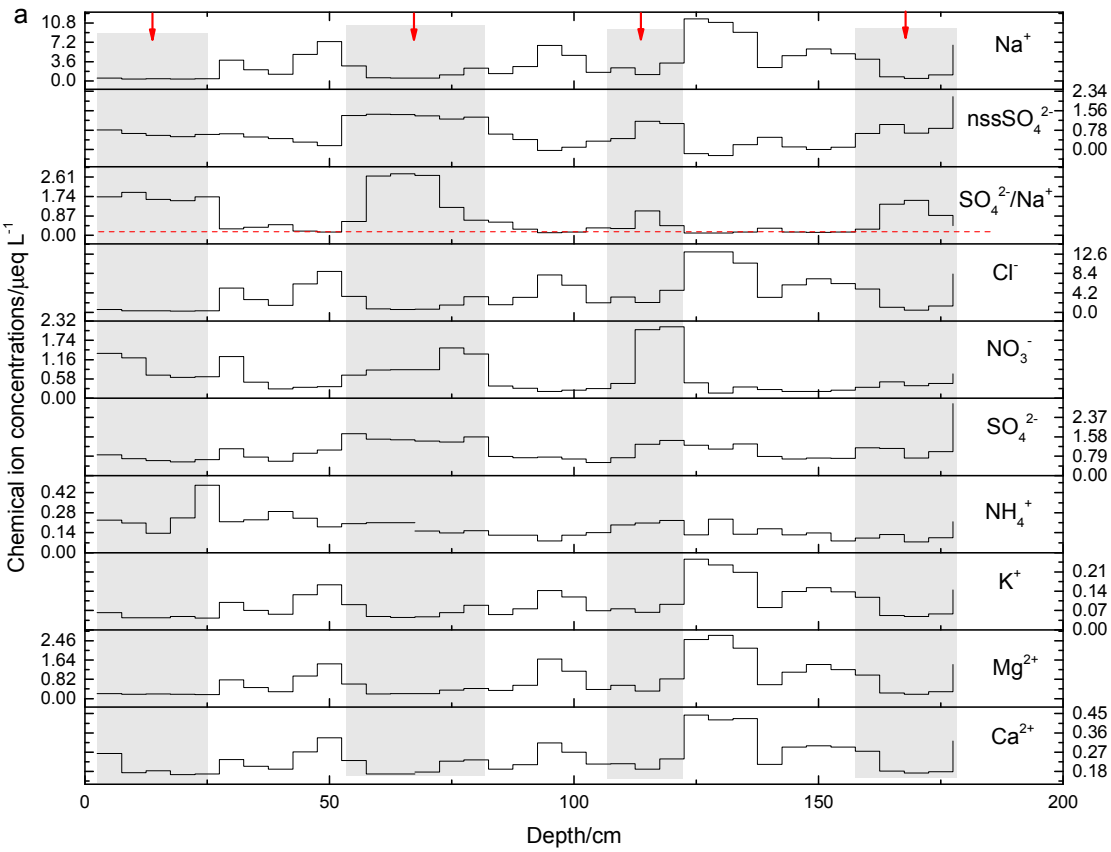
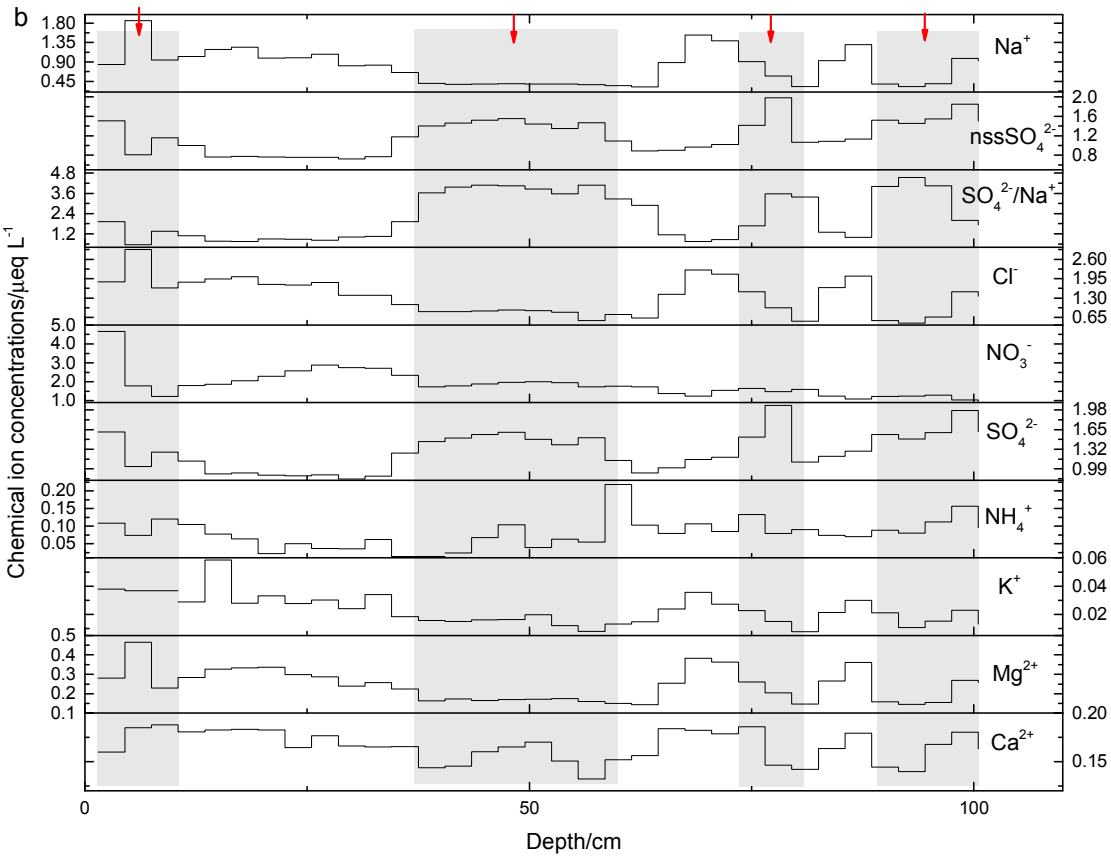

a
Chemical ion concentrations/μeq L-1
Depth/cm
Na+
nssSO4 2-
SO4 2-/Na+
Cl-
NO3-
SO4 2-
NH4+
K+
Mg2+
Ca2+

24


b
Chemical ion concentrations/μeq L-1
Depth/cm
Na+
nssSO4 2-
SO4 2-/Na+
Cl-
NO3-
SO4 2-
NH4+
K+
Mg2+
Ca2+

25

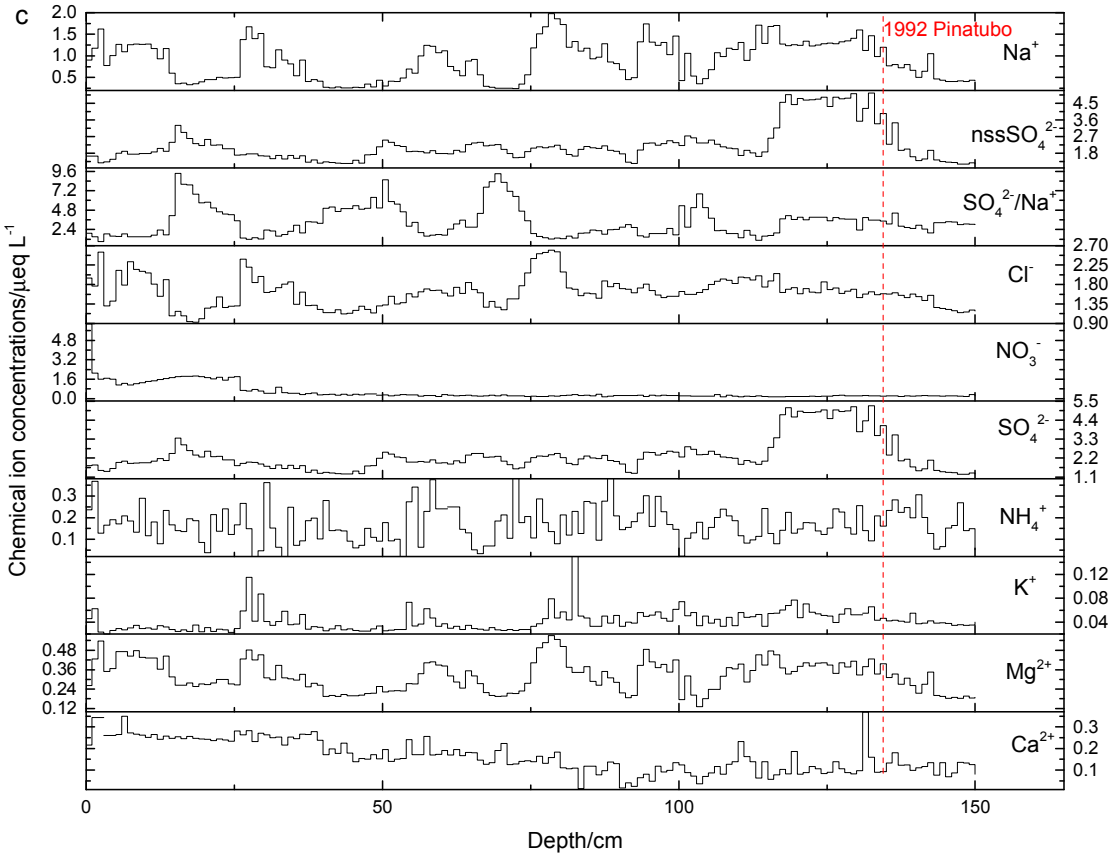


Figure S2. Profiles of chemical ions in snow pits P1 (a), P2 (b), and P3 (c). Snow pits P1 and P2 were sampled in the summer season in 2015-2016, and P3 was sampled in January 2010. The ratios of SO_4^{2-}/Na^+ in snow samples were also present. Red arrows in panels (a) and (b) represent the middle of the identified summer, and shaded areas denote summer seasons. (It is difficult to assign the samples in the snow pits to the four distinct seasons based on the measured parameters, and thus we choose a conservative assignment method, i.e., a summer season featured with higher $nssSO_4^{2-}$ and SO_4^{2-}/Na^+ ratio (and lower Na^+) and a winter season characterized with the opposite patterns.) The red dashed line in panel (a) represents the ratio of SO_4^{2-}/Na^+ in bulk seawater, while the red dashed line in panel (c) signifies the first snow sample significantly influenced by the Pinatubo eruption.

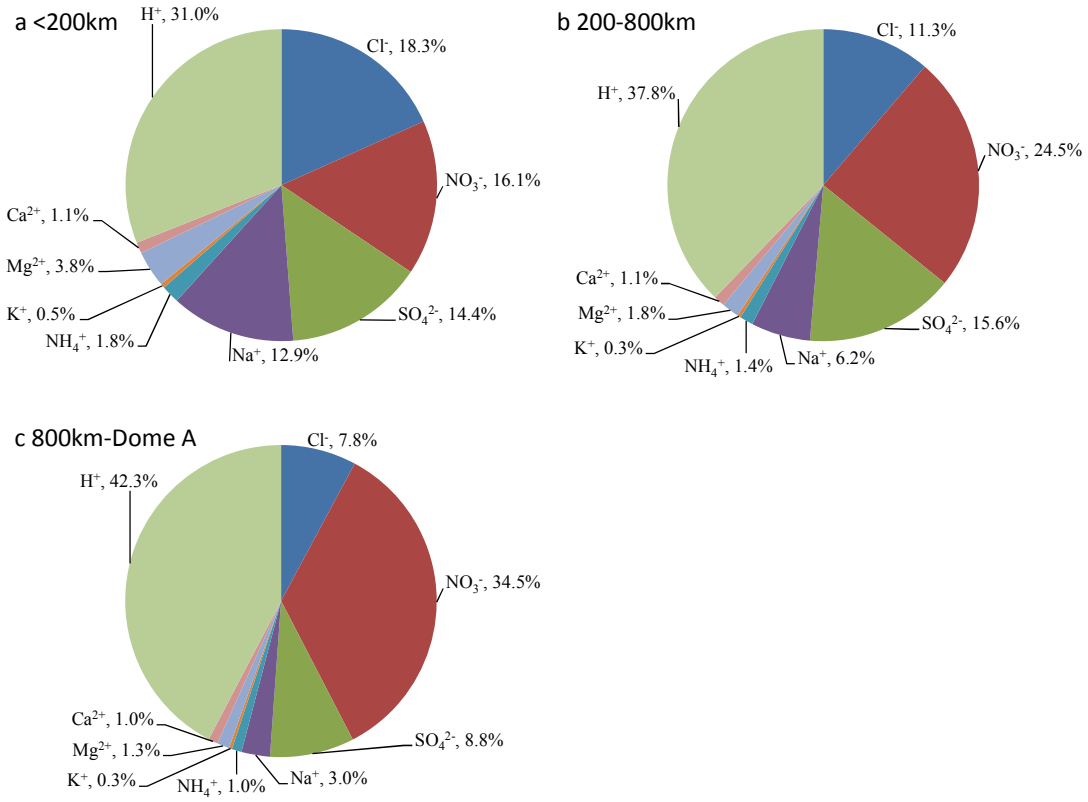


Figure S3. Contribution percentages of each ion to the total in different regions on the traverse, in μeq L^{-1}. The percentages of each ion in individual regions were calculated from the averages of all sites within the region.

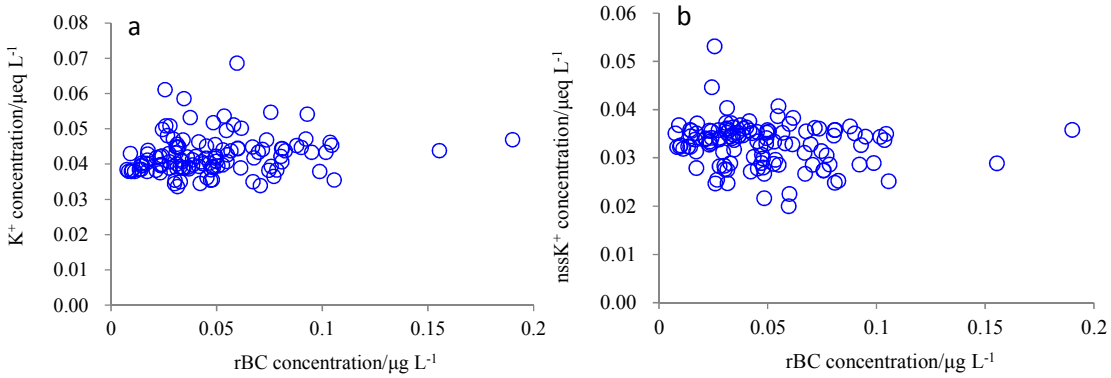


Figure S4. Correlations between refractory black carbon (rBC) and K^+ ($nssK^+$) in Antarctic surface snow collected in 2012-2013 campaign. The rBC analysis system consists of an ultrasonic nebulizer and desolvation system (CETAC UT5000) coupled with a Single Particle Soot Photometer (SP2, Droplet Measurement Technologies, Boulder, Colorado).

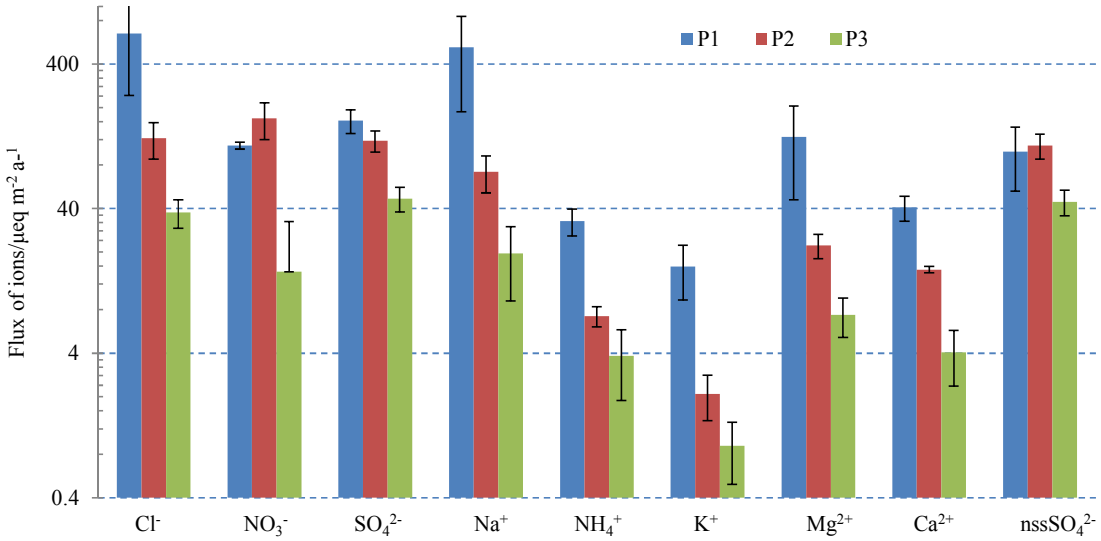


Figure S5. Ion fluxes at the three pits (P1, P2, and P3). The error bars represent one standard deviation of fluxes in different years. Note that a base-10 log scale is used for the *y*-axis.