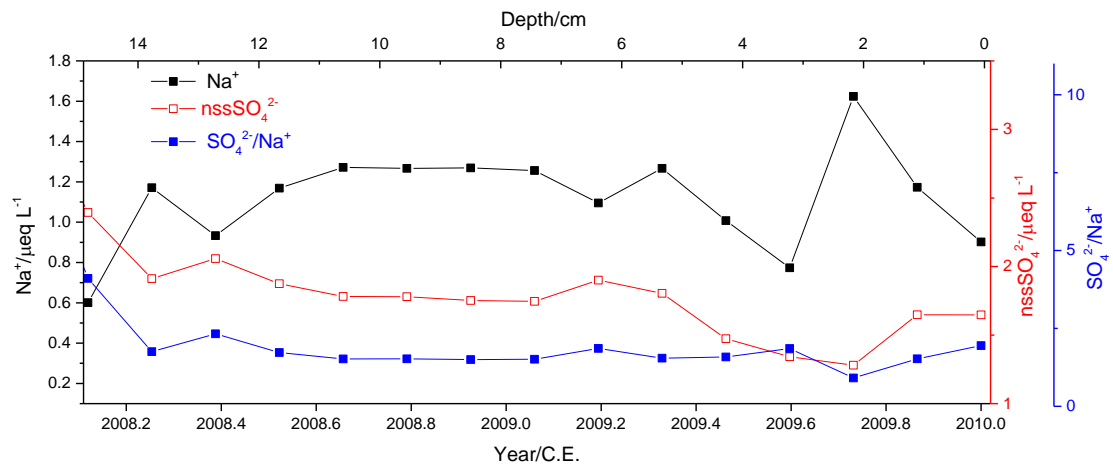


1 **Supplementary materials**

2 Three figures, i.e., Fig. S1, Fig. S2 and Fig. S3, are included in the supplementary materials.

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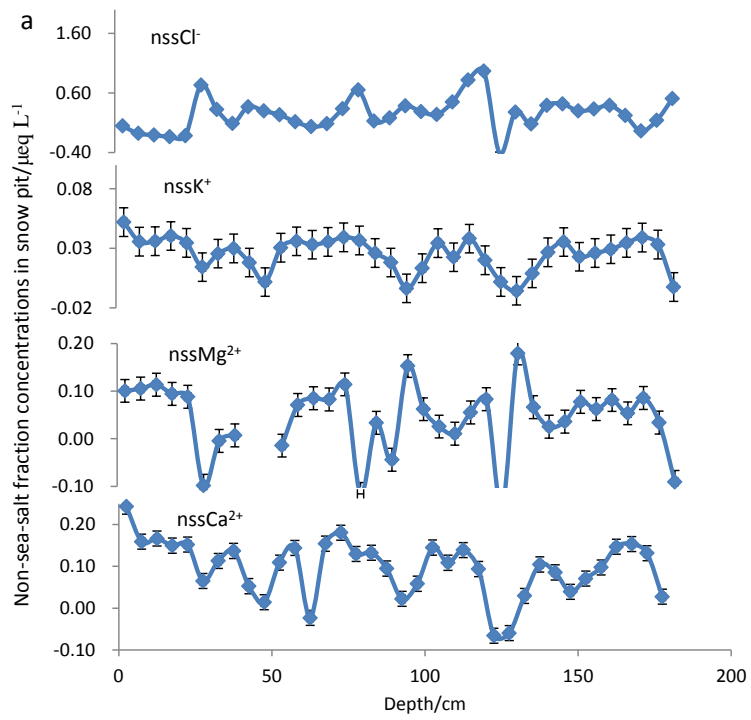


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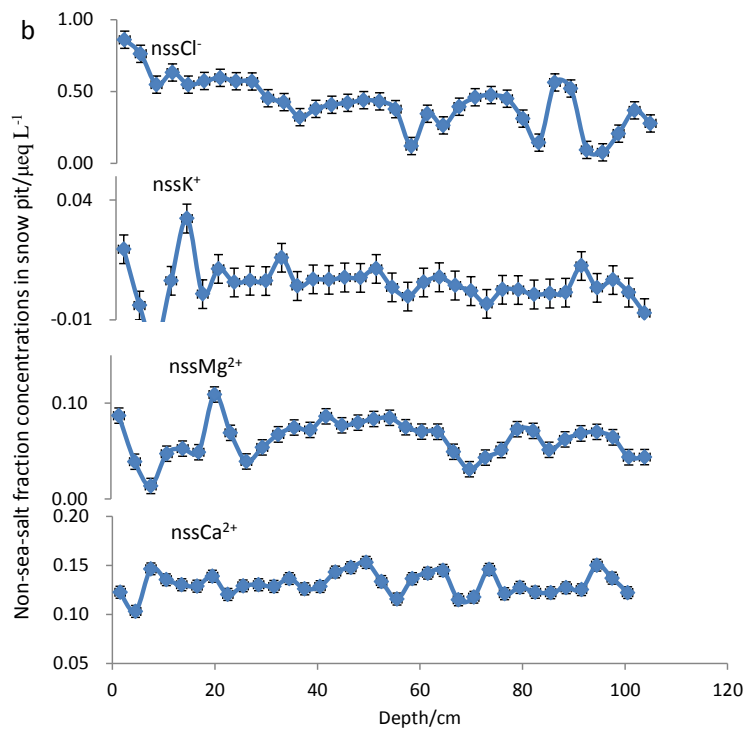
6 **Figure S1.** Variations in Na^+ , nssSO_4^{2-} , and $\text{SO}_4^{2-}/\text{Na}^+$ ratio in the snow in the years 2008 and 2009, in
7 Dome A snow pit (P3).

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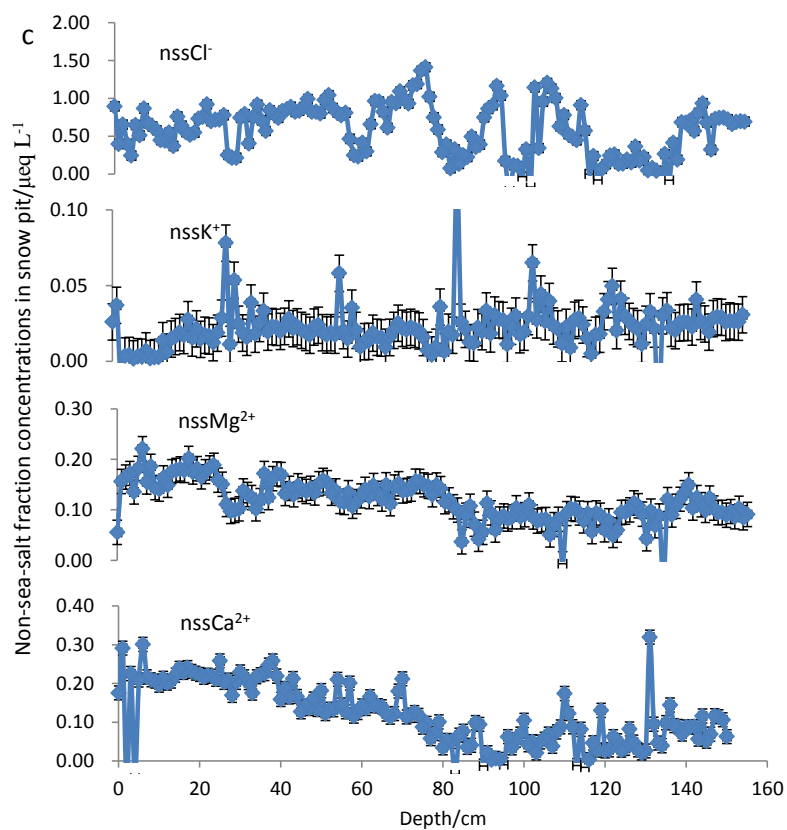
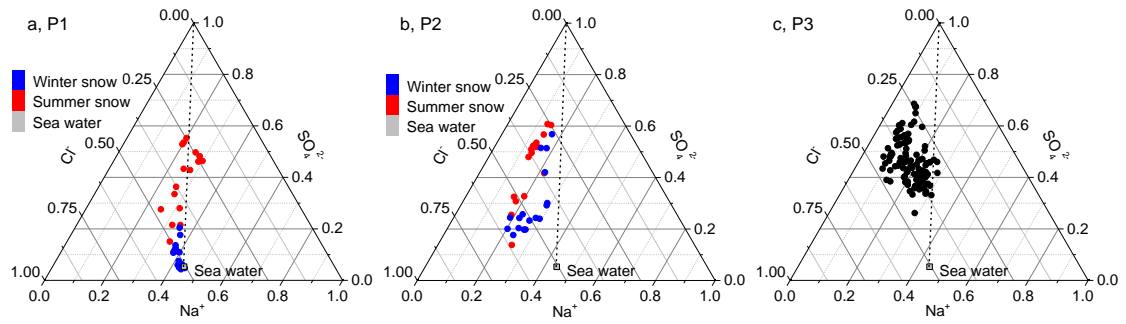


Figure S2 Profiles of non-sea-salt fractions of ions (nssCl^- , nssK^+ , nssMg^{2+} , and nssCa^{2+}) in snow pits P1 (a), P2 (b), and P3 (c). Snow pits P1 and P2 were sampled in the summer season in 2015-2016, and P3 was sampled in January 2010. With error bars of 2σ .



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19 **Figure S3.** Ternary plot of Cl^- , Na^+ , and SO_4^{2-} in snow pits P1 (a), P2 (b), and P3 (c), with blue and red
 20 dots in panels (a) and (b) representing winter and summer snow, respectively. Bulk seawater
 21 composition is denoted by a grey square. The dashed line extending between the sea salt reference
 22 value and the SO_4^{2-} summit represents the composition of sea salt with increasing SO_4^{2-} .