

Supplement of

**Revisiting the eruptive nature of the 1108–1110 CE volcanic episode:
Insights from sulfur isotopes and cryptotephra in Greenland ice cores**

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***Supplementary Tables** are not included in this document and are provided in a separate Excel file*

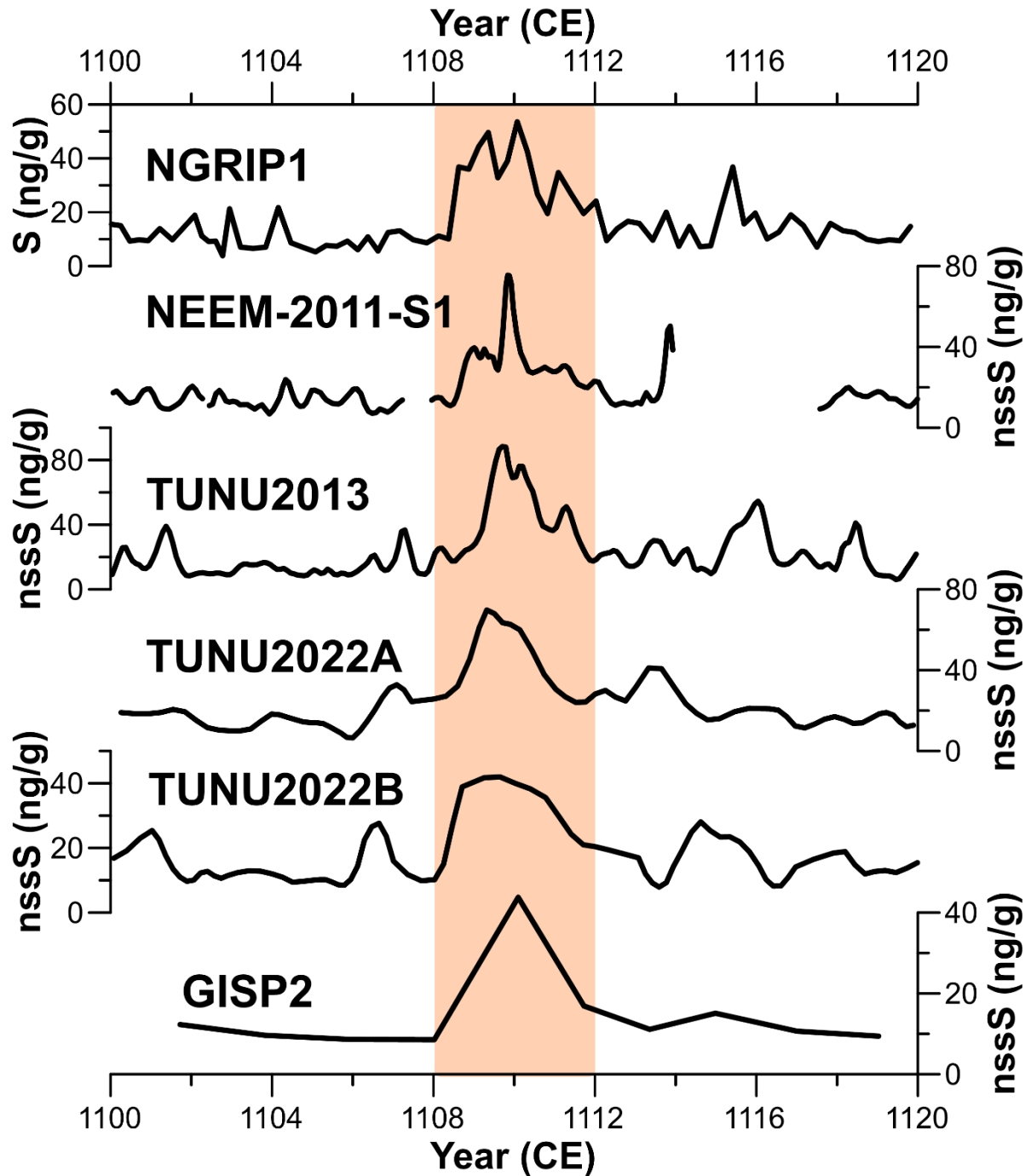


Figure S1. Total or non-sea-salt (nss) sulfur concentration records between 1100 and 1120 CE from the NGRIP1 (Plummer et al., 2012; Sigl et al., 2015; Sinnl et al., 2022), NEEM-2011-S1 (McConnell, 2013; Sigl et al., 2015; Sinnl et al., 2022), TUNU2013 (Sigl et al., 2015; McConnell, 2016; McConnell et al., 2018, 2019), TUNU2022A (McConnell et al., 2018; McConnell and Chellman, 2024), TUNU2022B (McConnell et al., 2018; McConnell and Chellman, 2024), and GISP2 (Mayewski et al., 1997; Sigl, 2019) ice cores in Greenland, all of which were used for calculating the revised volcanic stratospheric sulfur injection (VSSI; see Sect. 2.4). The orange shaded band highlights the interval of volcanic sulfate deposition associated with the 1108–1110 CE volcanic episode.

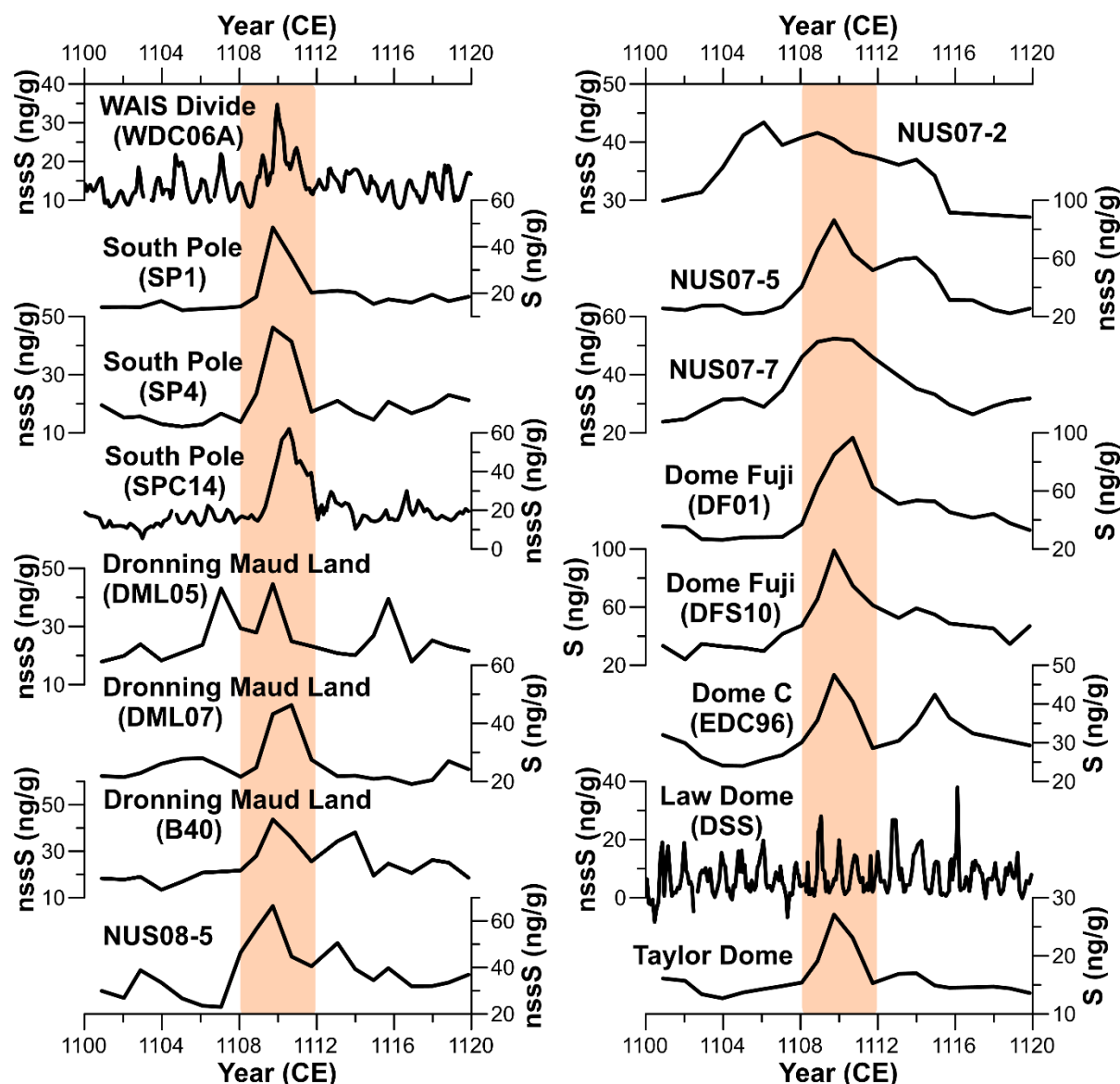


Figure S2. Total or non-sea-salt (nss) sulfur concentration records between 1100 and 1120 CE from the WAIS Divide (Sigl et al., 2013, 2014, 2015), South Pole (Budner and Cole-Dai, 2003; Ferris et al., 2011; Sigl et al., 2015; Winski et al., 2021), Dronning Maud Land (Traufetter et al., 2004; Sigl et al., 2014, 2015), NUS08-5 (Sigl et al., 2014, 2015), NUS07-2 (Sigl et al., 2014, 2015), NUS07-5 (Sigl et al., 2014, 2015), NUS07-7 (Sigl et al., 2014, 2015), Dome Fuji (Motizuki et al., 2014; Sigl et al., 2014, 2015), Dome C (Castellano et al., 2005; Sigl et al., 2015), Law Dome (Jong et al., 2022), and Taylor Dome (Mayewski et al., 1996; Sigl et al., 2015) in Antarctica, all of which were used for calculating the revised VSSI except the NUS07-2 and DSS ice cores (see Sects. 2.4 and 3.3). The orange shaded bands highlight the interval of volcanic sulfate deposition associated with the 1108–1110 CE volcanic episode.

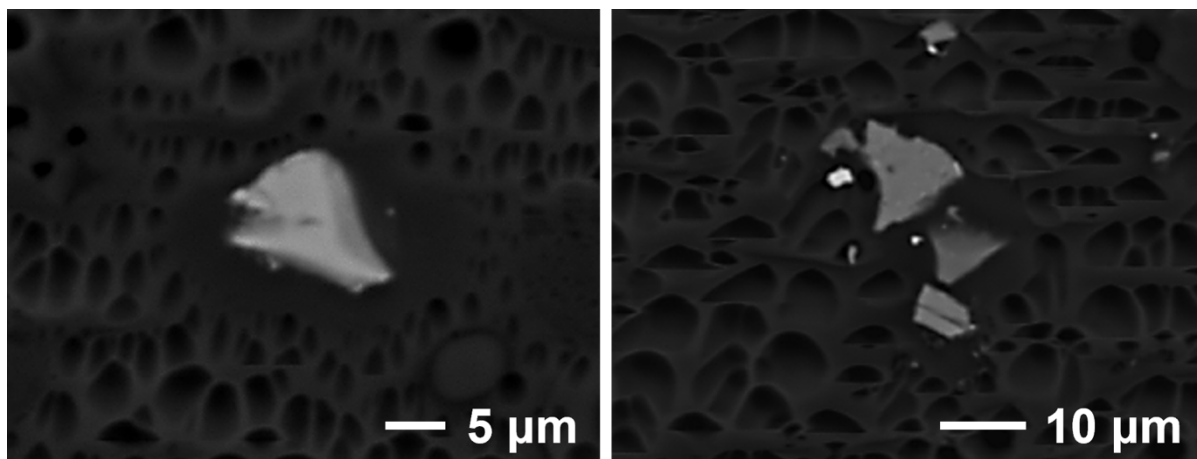


Figure S3. Selected backscattered electron (BSE) images of glass shards from the NGRIP1 cryptotephra samples.

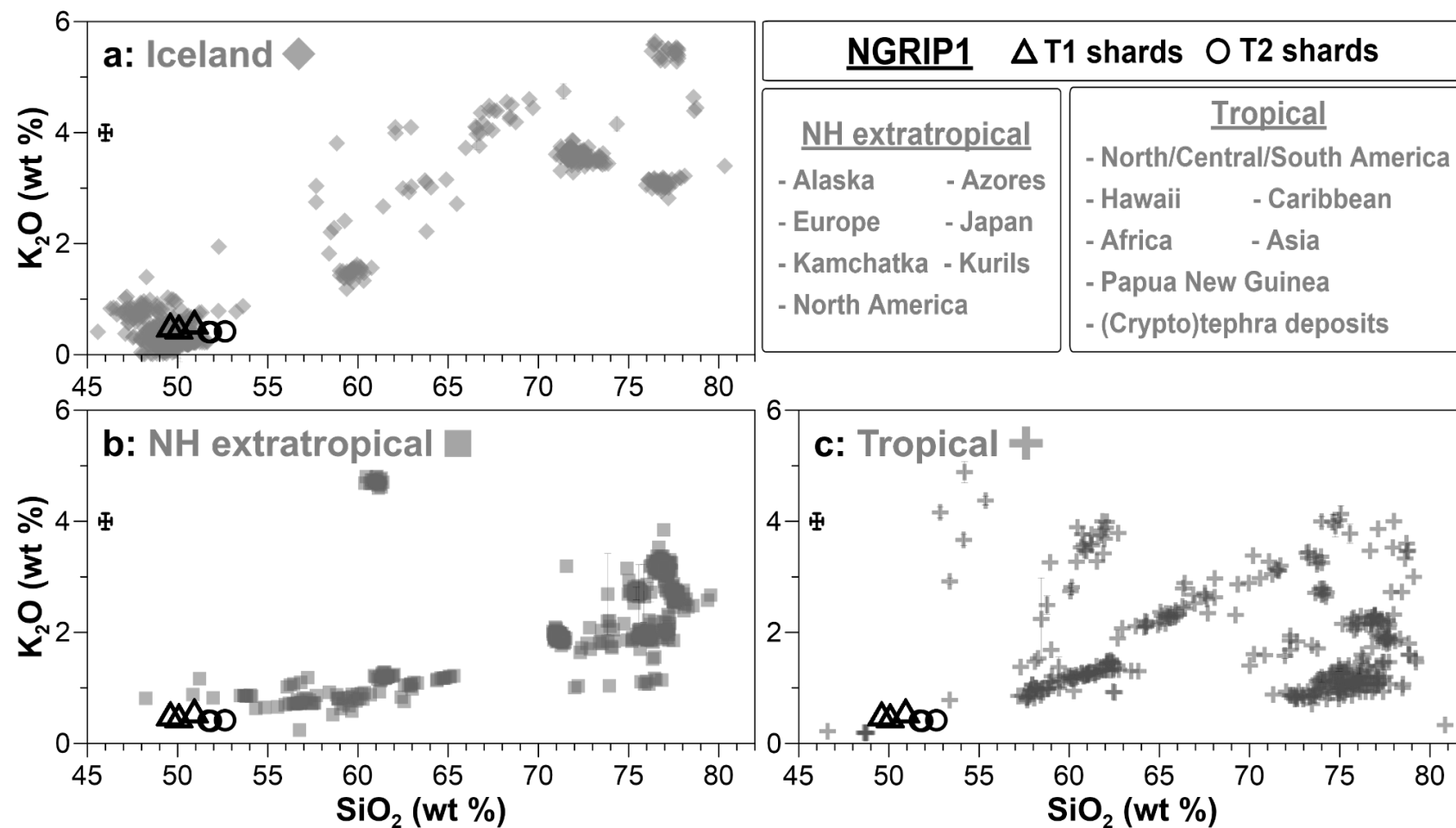


Figure S4. Glass compositions from the NGRIP1 T1 (open triangles) and T2 (open circles) cryptotephra samples, compared with volcanic materials from Icelandic eruptions (**a**; grey diamonds; see **Table 2**) and from eruptions with currently unassigned VEI ratings that occurred during 1000–1200 CE in the NH extratropics, including Alaska, the Azores, Europe, Japan, Kamchatka, the Kurils, and North America (**b**; grey squares; see **Table S3**), and in the tropics, including North/Central/South America, Hawaii, the Caribbean, Africa, Asia, and Papua New Guinea, as well as (crypto)tephra deposits in sediments (**c**; grey crosses; see **Table S3**). Error bars (upper left) represent the maximum analytical uncertainty ($\pm 1\sigma$) based on repeated measurements of secondary standards.

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