

## Supplemental information

The full SI:RAID dataset of all measurements of chemical ions and stable water isotope composition, with top and bottom ages and uncertainties for every sample, is available on Pangaea.

### Table S1: Annual layer counting:

File: S1\_annuallayers\_300523.xlsx

Two columns:

1. depth
2. yb2020

### Table S2: S isotope data

File: S2\_sisotope\_300523.xlsx

Ten columns:

1. Sample
2. Bottom\_depth
3. Mean\_d34SO4\_permil
4. SD\_d34SO4\_permil
5. Mean\_D33S\_permil
6. SD\_D33S\_permil
7. n
8. Background\_Volcanic
9. Stratospheric
10. Eruption

### Table S3: SI:RAID Sample Depth/Age

File: S3\_agescale\_limited\_300523.xlsx

Four columns:

1. Sample
2. Bottom\_depth
3. Bottom\_age\_b1950
4. Uncert\_yrs