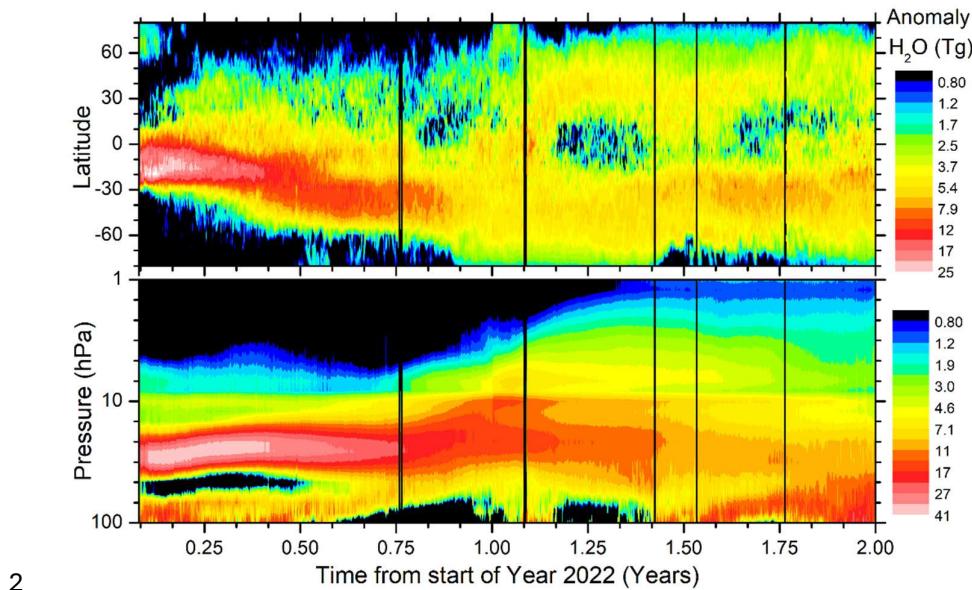
1   **Supplementary Figures**

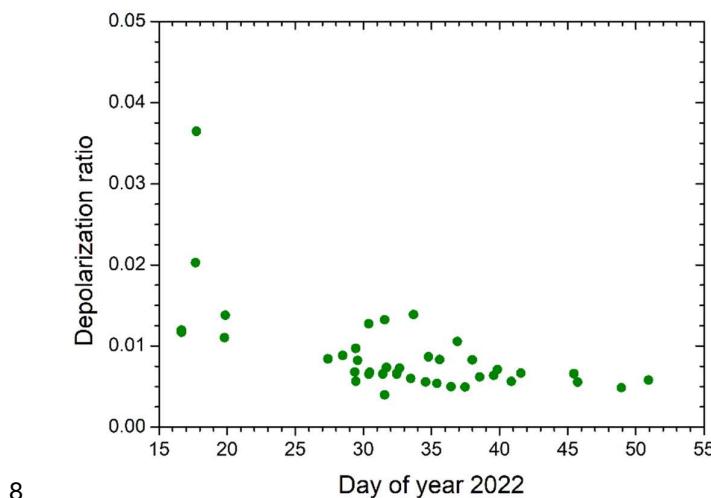
2

3   **Figure S1.** Distributions of water vapor (H_2O) in the stratosphere after the 2022 Hunga Tonga volcanic eruption.

4   a) Latitude and b) altitude distributions of H_2O anomaly. The integration element sizes in a) span 1 – 100 hPa,

5   4° in latitude and 360° in longitude, and in b) -82 to 82° in latitude, 360° in longitude and atmospheric pressure

6   ratio 1.21 (~1.32 ± 0.1 km). The minor vertical tick marks show five of the eleven measurement levels inside a

7   decade (1.5, 2.2, 3.2, 4.6 and 6.8 hPa respectively, and 10 times these values in the next decade).

8

9   **Figure S2.** Particle depolarization ratio of dense aerosol layers from CALIOP the first few weeks after the HT-

10   22 eruption.

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