SUPPLEMENTARY INFORMATION

200-years ice core bromine reconstruction at Dome C (Antarctica): observational and modelling results

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SUPPORTING INFORMATION SUMMARY: we provide further information about the back-trajectory calculations, photolysis rate at different wavelength ranges and additional figures to highlight the negligible role of volcanic eruptions in affecting bromine preservation at Dome C.
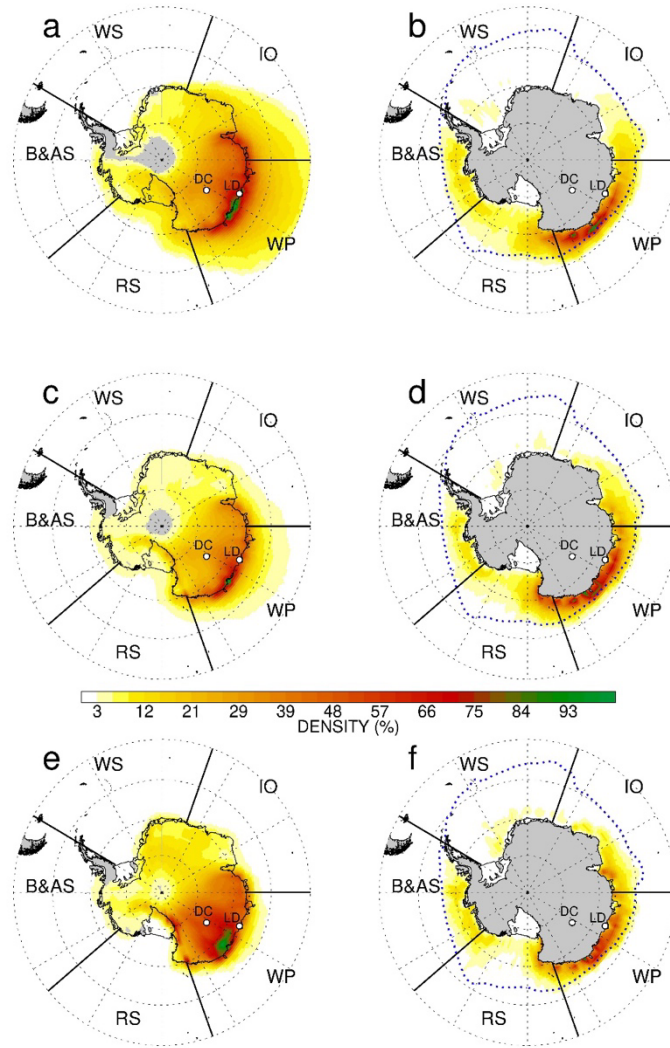
Figure S1 - 5-days back-trajectory analysis of air masses arriving at the Dome C site for the period 1979-2018. The back-trajectories are calculated at (a,b) 1000 m, (c,d) 2000 m, (e,f) 3000 m above Dome C model terrain height for the period 1979-2018. Maps are divided into five sectors: Indian Ocean (IO, 20°-90°), Western Pacific Ocean (WP, 90°-150°), Ross Sea (RS, 160°-230°) and Bellingshausen & Amundsen seas (B&A, 230°-20°). Panels on the left (a, c, e) represent the sum of the total number of backward trajectory points (i.e. hours) within the fifth and the second days, found in each 1° x 1° grid cell . Panels on the right (b, d, f) represent backward trajectory points (i.e. hours) within the MBL that cross areas with > 15% sea ice concentration at the given point of time. Each contour is normalized from 0 to 100 rescaling with respect to its maximum values and resampled to 0.5° x 0.5° grid mesh in order to increase readability. The blue dashed line represents the median ice edge in September (maximum extent) over the period 1979-2018.
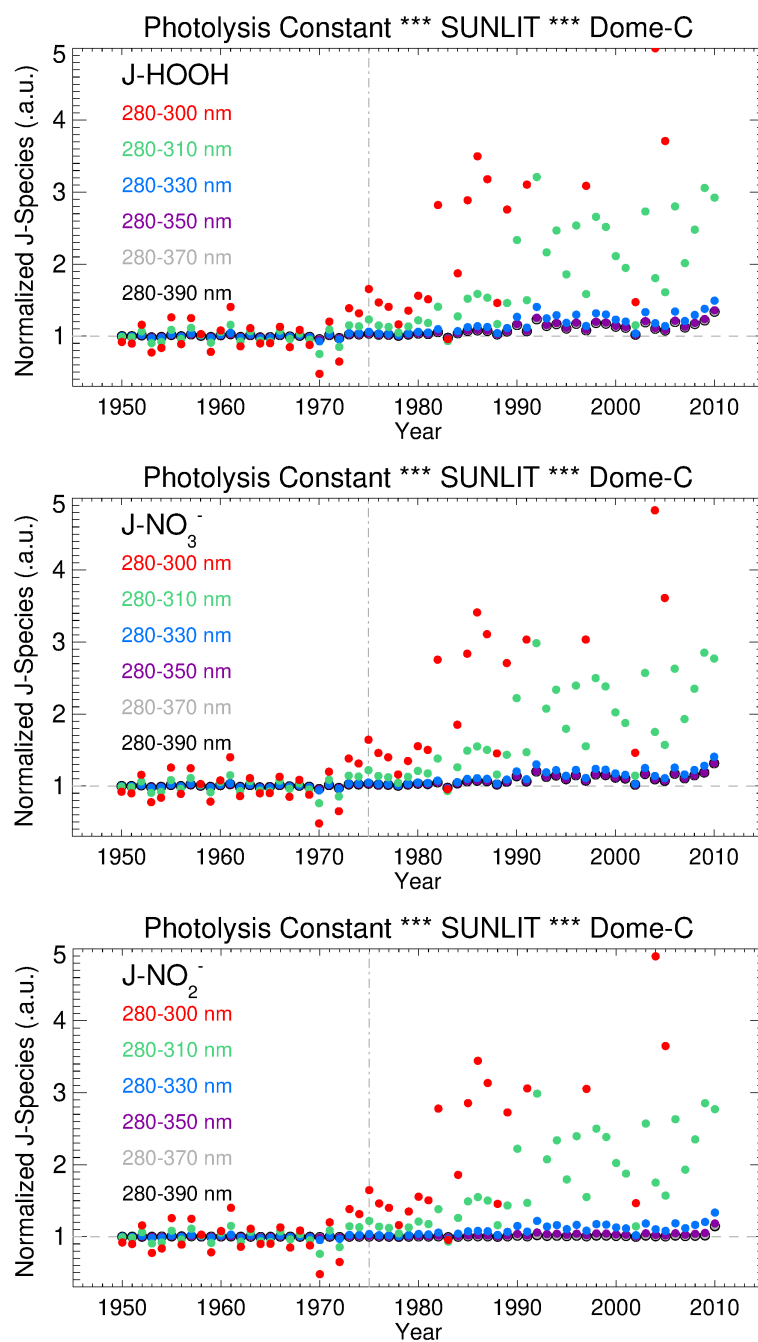
Figure S2 - The photolysis rate (normalized J-value) is reported for H_2O_2 (upper panel), NO_3^- (middle panel) and NO_2^- (bottom panel) calculated over different wavelength ranges (see main text for more details).
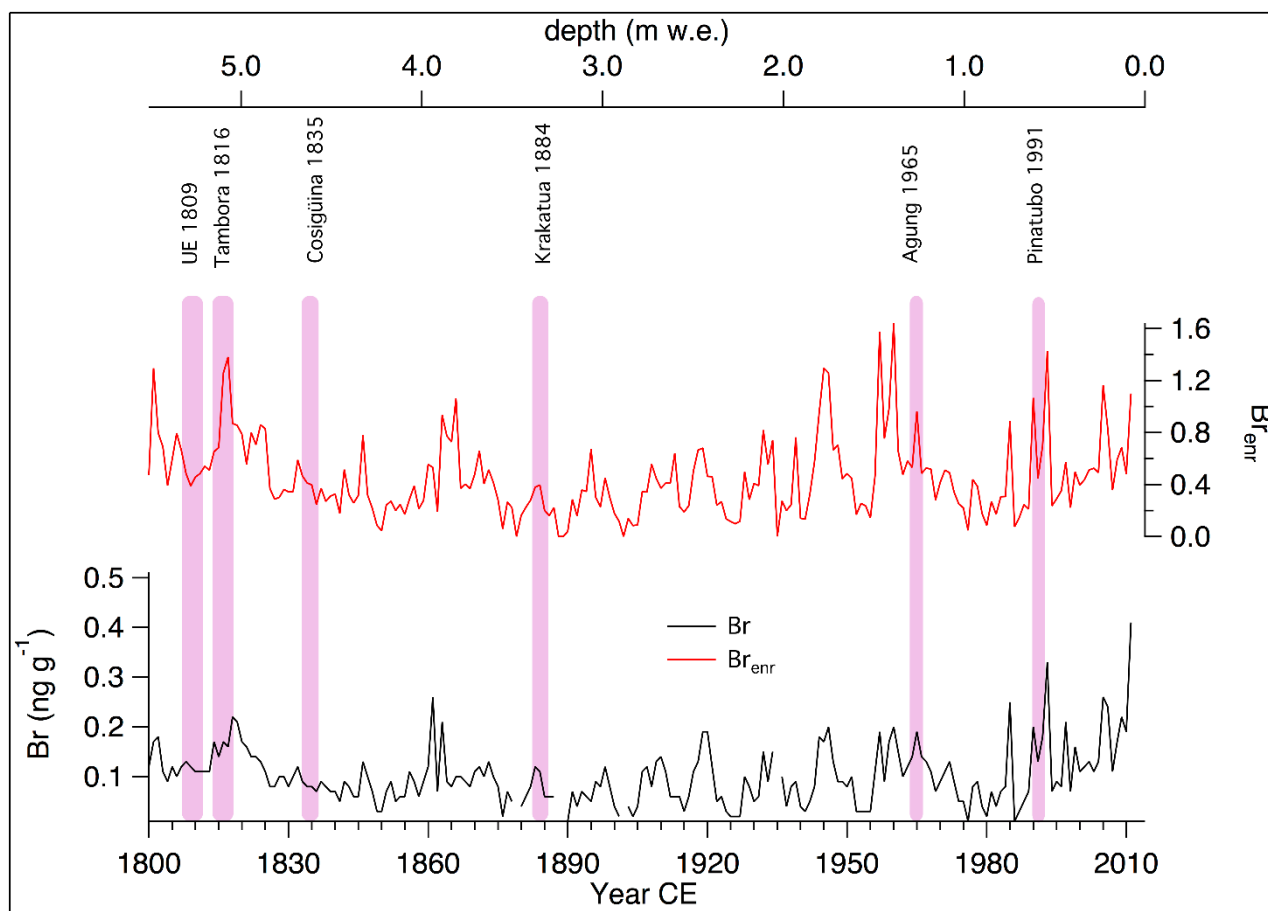
Figure S3 - Br_enr (top, red curve), Br (bottom, black curve) records and volcanic eruptions (highlighted with pink vertical bar). Ice core depth is expressed as meters of water equivalent (m w.e.).