



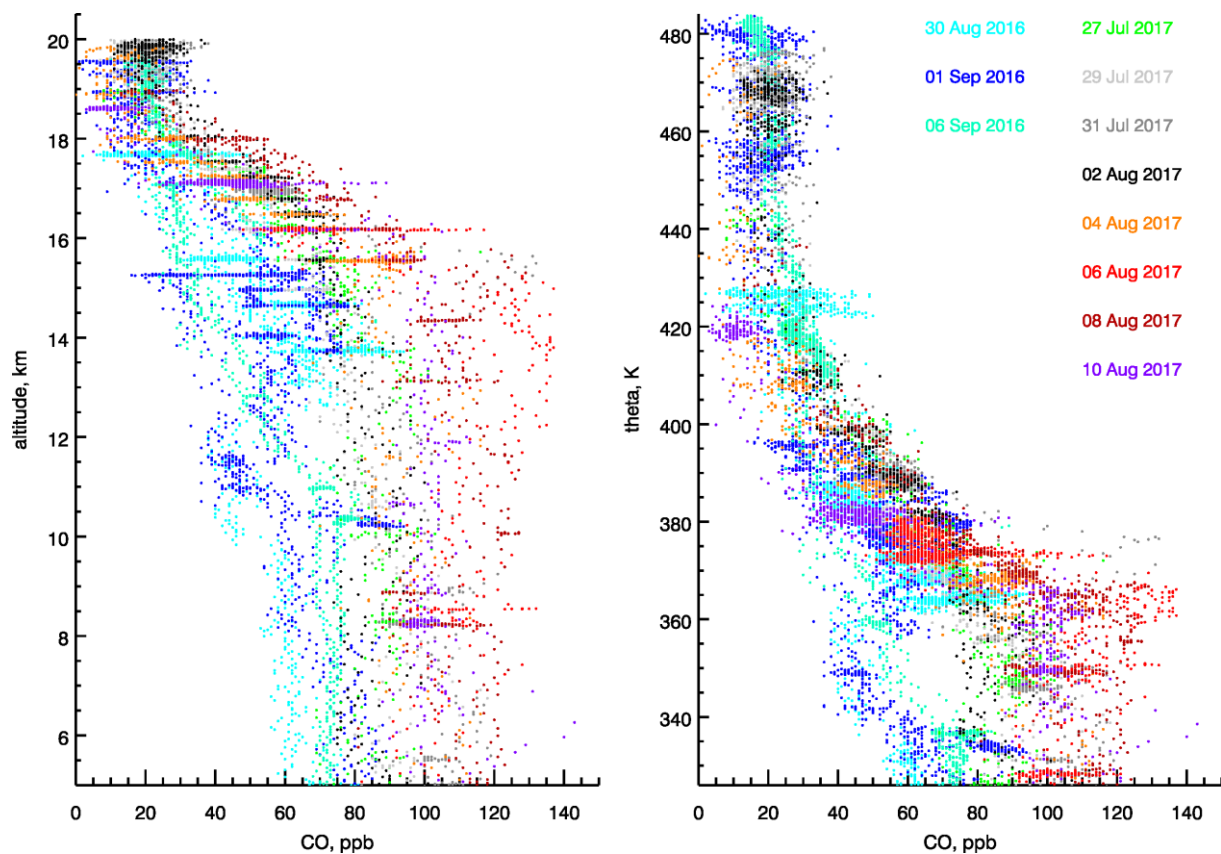
Supplement of

Upward transport into and within the Asian monsoon anticyclone as inferred from StratoClim trace gas observations

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830 **Figure S1.** AMICA CO profiles for individual flights against geometric altitude (left) and potential temperature (right).

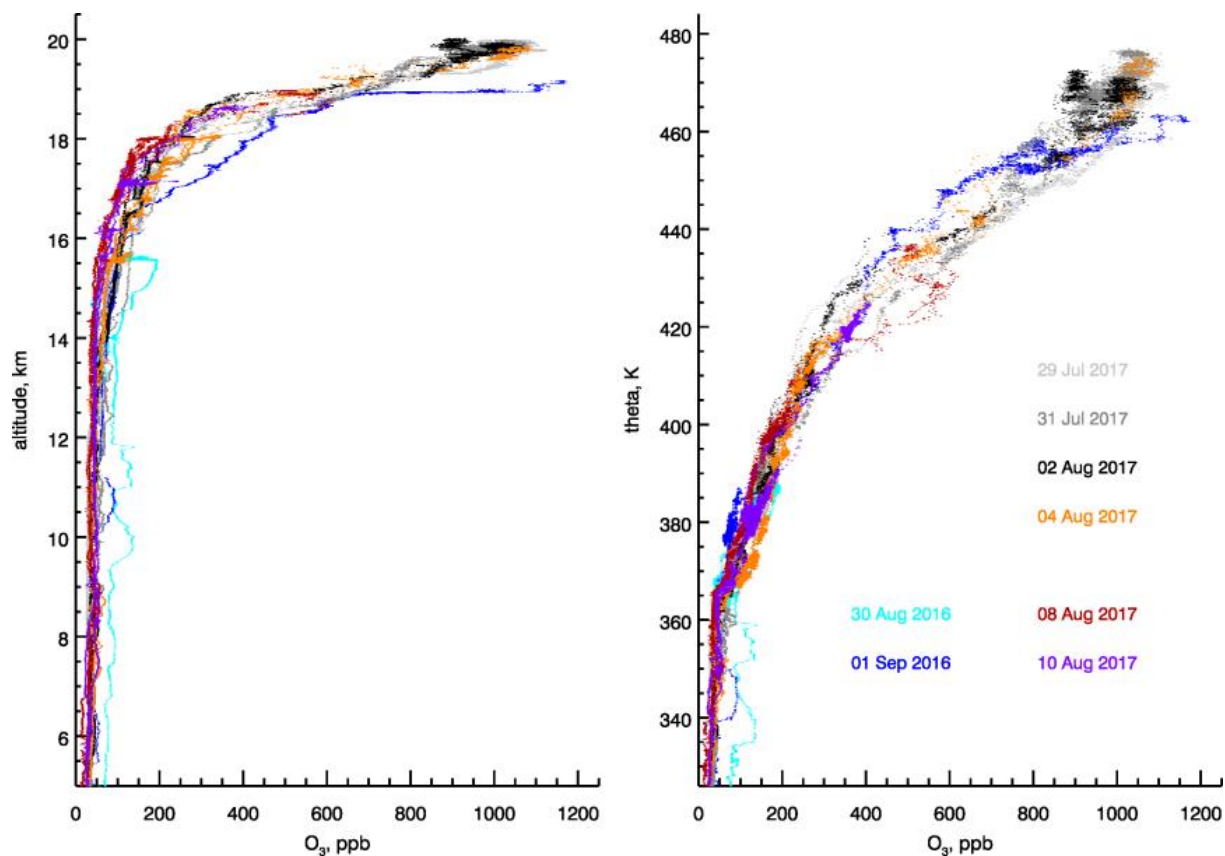
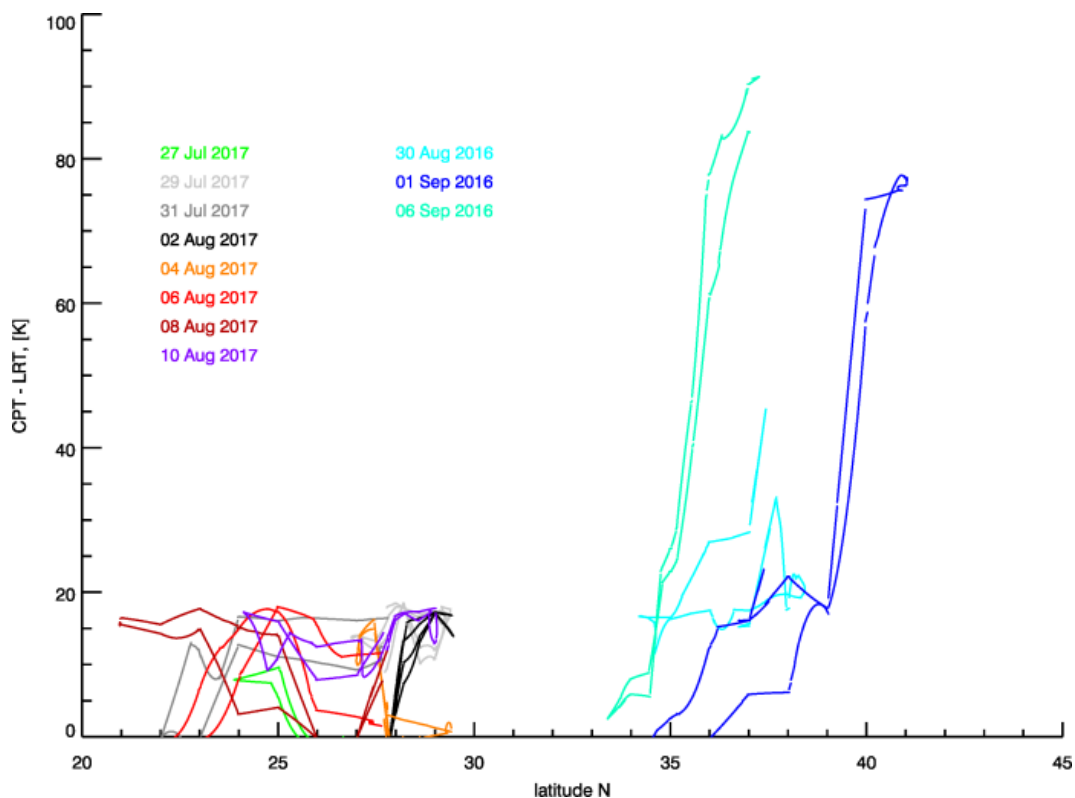


Figure S2. FOZAN O_3 profiles for individual flights against geometric altitude (left) and potential temperature (right).



835 **Figure S3.** Difference in $\Delta\theta$ between CRT and LRT along (i.e. above or below) each flight path deduced from ERA-Interim reanalysis data as a function of latitude. The change to large differences with $\Delta\theta > 20$ K over a small latitude range observed during the Kalamata flights denotes the transition from the tropical to the extratropical regime. Note that outside of the tropics, the cold point is not normally used as a representation of the tropopause.

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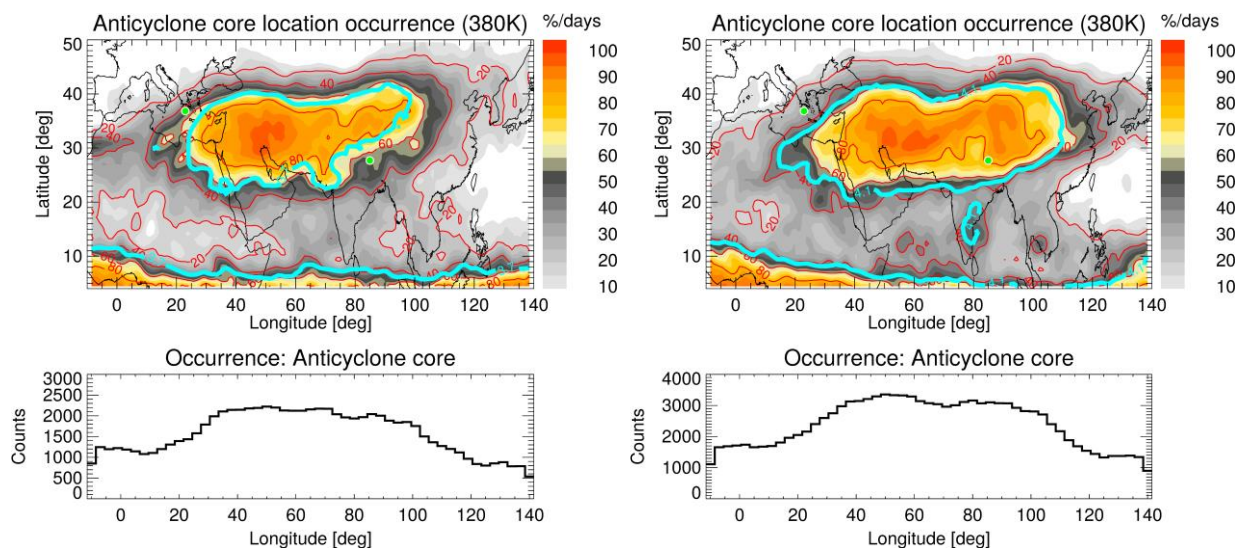


Figure S4. Occurrence frequency of the ASM anticyclone for the periods between 1 July and 31 August in 2016 (left) and 2017 (right) according to the PV-based criteria proposed by Ploeger et al. (2015). Red contours show selected percentage values (20, 40, 60, 80 %), the thick cyan contour shows the average PV value of the barrier in the average PV field over the periods considered (3.7 PVU in 2016 and 4.1 PVU in 2017). The StratoClim campaign bases Kalamata and Kathmandu are marked by the green dots. Bottom panels show the projections of anticyclone occurrence frequency onto the longitude axis (bin size 2.5°). The figure is analogous to Figure 13a in Ploeger et al. (2015).

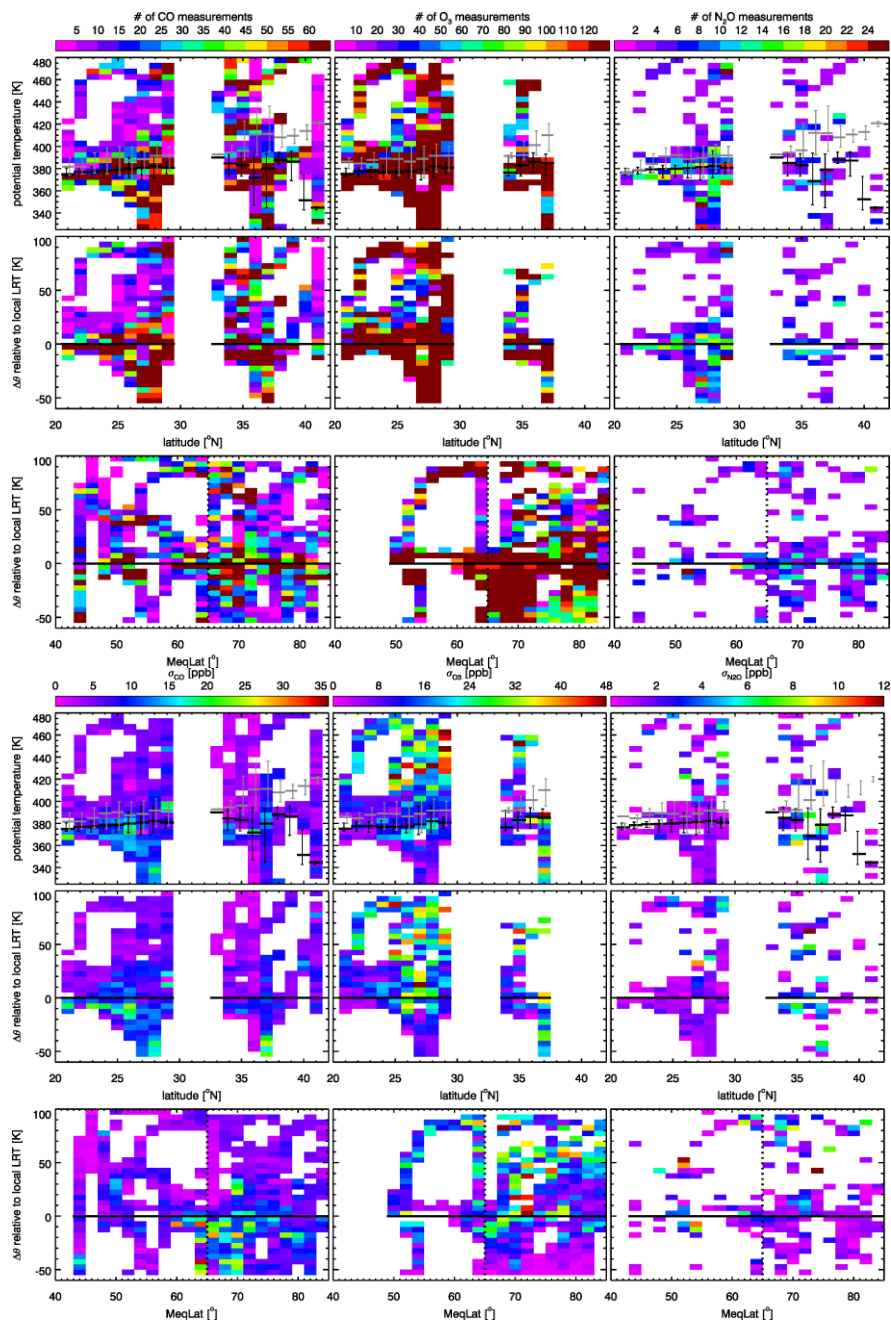


Figure S5 Number of observations (top 6 panels) and standard deviations (bottom 6 panels) on different coordinates for each bin corresponding to the averaged CO, O₃ and N₂O mixing ratios shown in Figure 3.

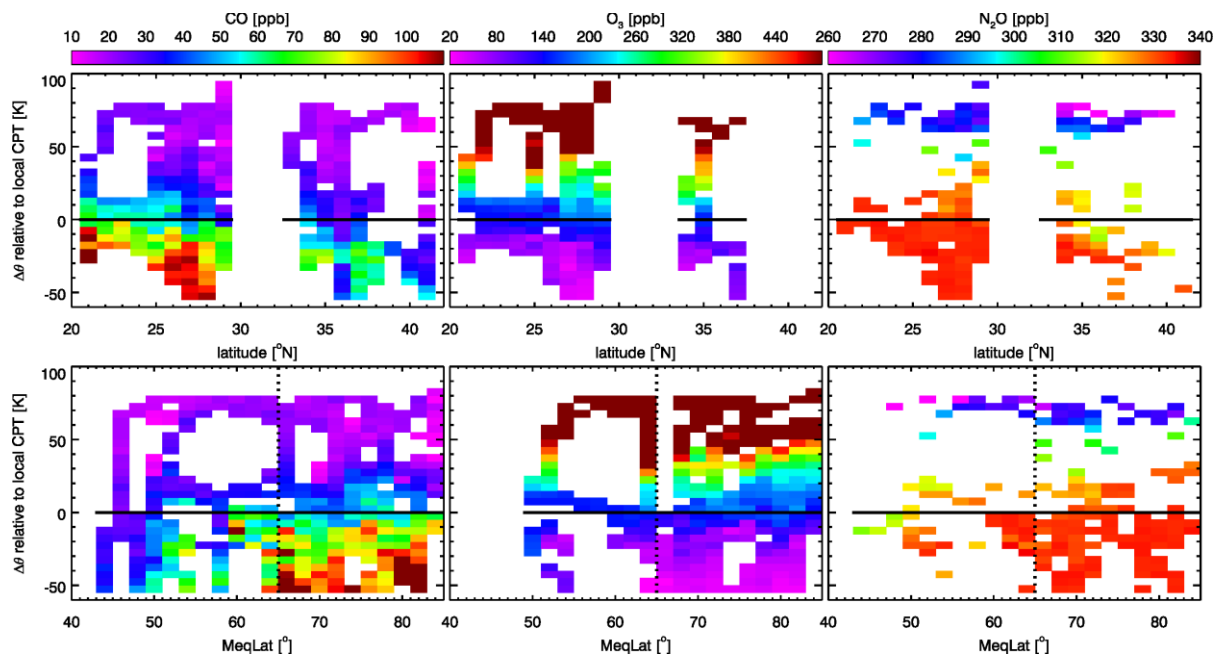


Figure S6. Analogous to Figure 3, middle and bottom row, but with the vertical coordinate designated as potential temperature differences relative to the CPT rather than the LRT.

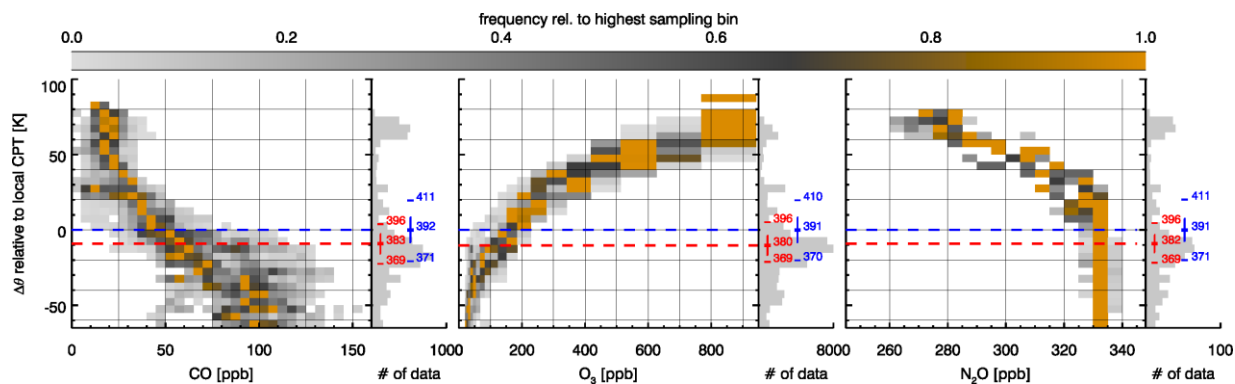


Figure S7. Analogous to Figure 4, bottom row, but with the vertical coordinate designated as potential temperature differences relative to the CPT rather than the LRT.