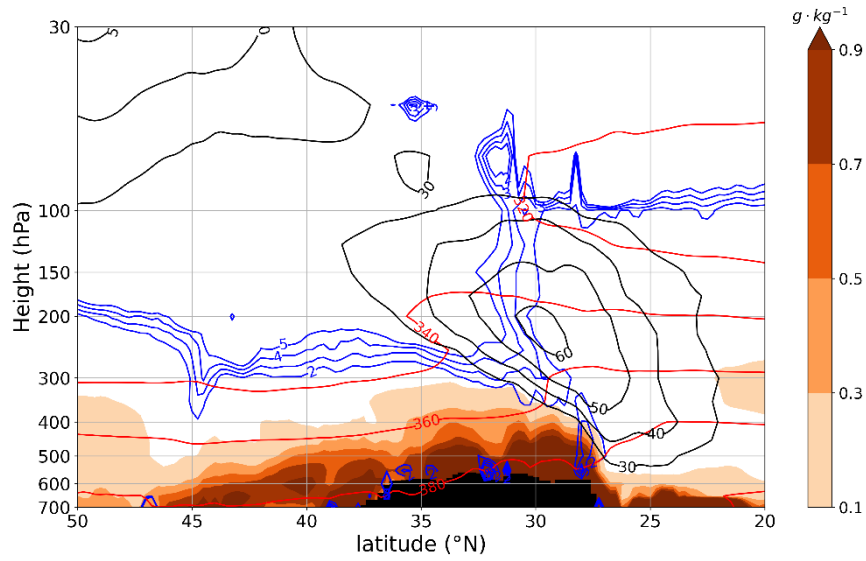
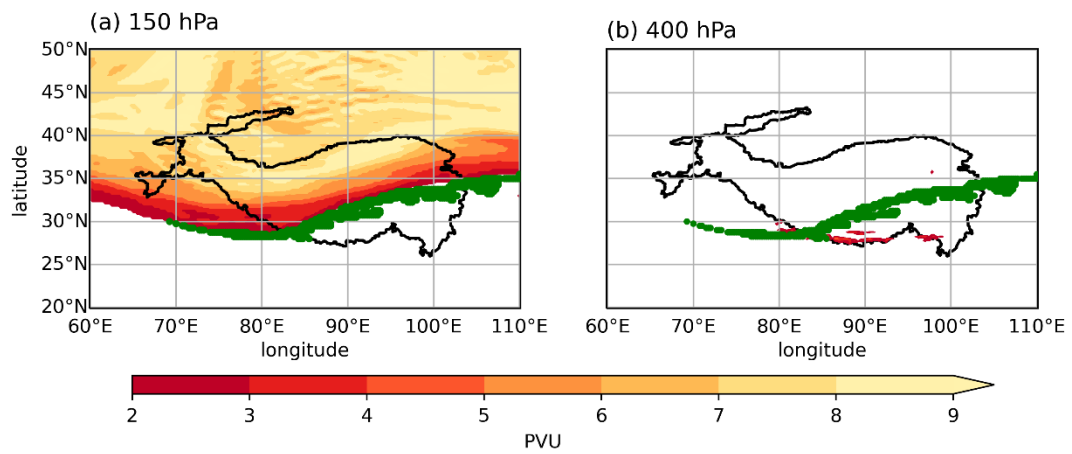


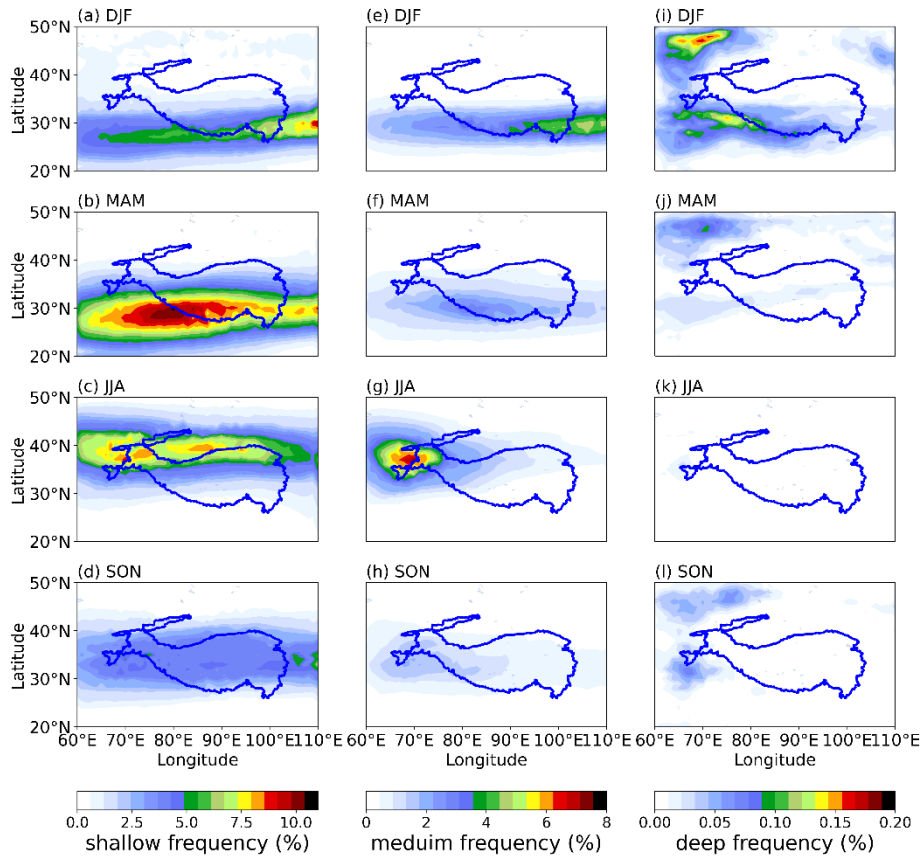
1 Appendices



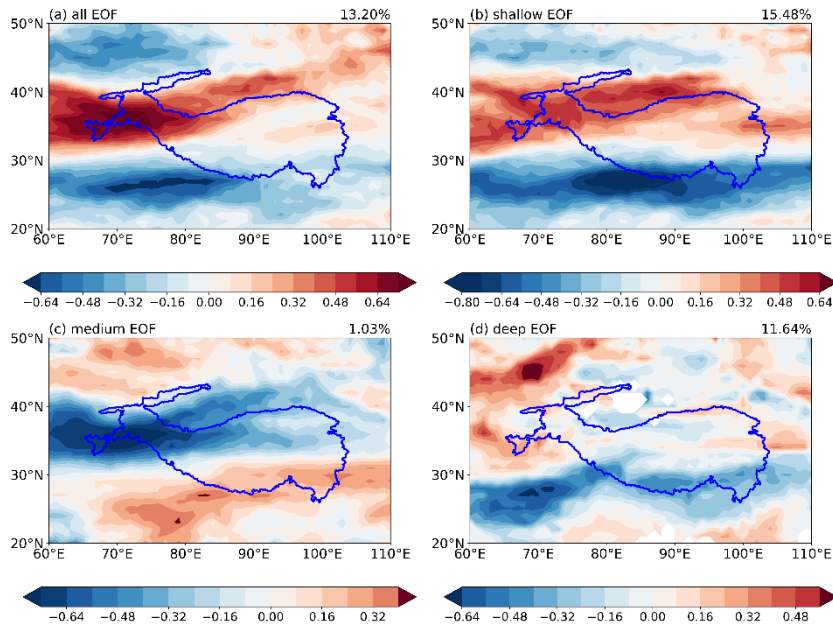
2 Figure S1: Zonal profile of the tropopause fold over the Tibetan Plateau region at UTC 01 hours on February 26,
 3 2008 (92.0°E). The red solid line is the isopotential temperature line (K), the blue solid line is the 2-5 PVU isovalue
 4 line, and the black solid line is the zonal wind speed ($\text{m}\cdot\text{s}^{-1}$).



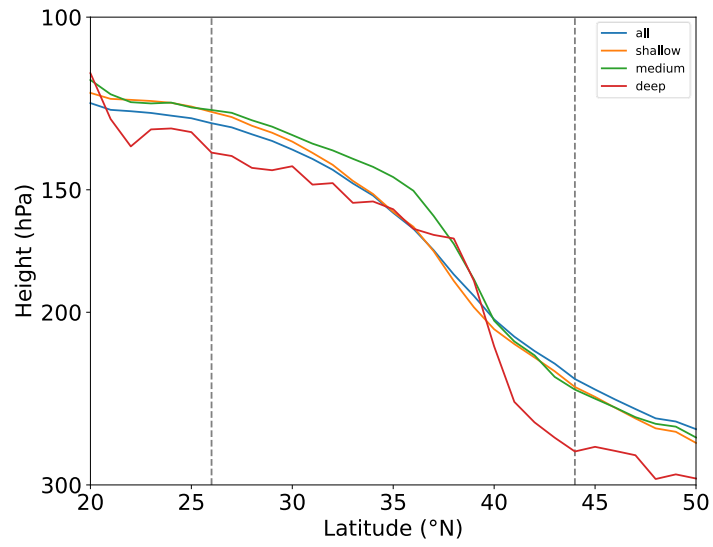
5 Figure S2: Distribution of 2 PVU potential vortices (colored) and folding locations (green dots) at altitudes of 150hPa
 6 (a) and 400hPa (b) on the Qinghai-Tibet Plateau at 11:00 UTC on February 25, 2008.



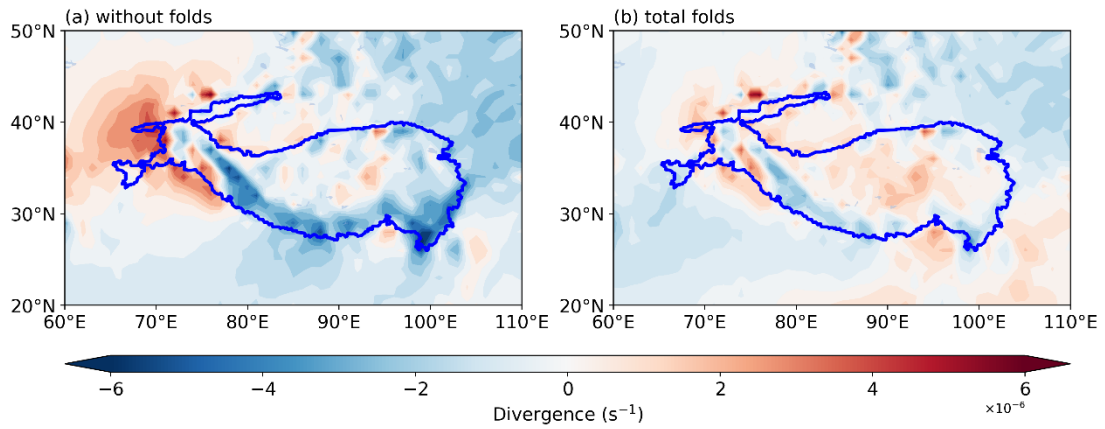
7 Figure S3: Frequency (coloring) distribution of different types of folds in the tropopause in different seasons over
8 the Qinghai-Tibet Plateau from 1979 to 2019 calculated by the improved 3D labeling method. a, e, i are winter
9 (December-February), b, f, j are spring (March-May), c, g, k are summer (June-August), d, h, i are autumn
10 (September-November) results. The blue solid line represents the contour line at an altitude of 3 km.



11 Figure S4: EOF analysis of the frequency of tropopause folds over the Tibetan Plateau region from 1979 to 2019. a,
12 b, c, and d are the secondary modes of EOF of the total folds, shallow folds, medium folds, and deep folds,
13 respectively.



14 Figure S5: Latitudinal profile of the height of the tropopause fold over the Qinghai-Tibet Plateau from 1979 to 2019.



15 Figure S6: Distribution of convergent and divergent winds in the UTLS area on the Qinghai-Tibet Plateau from 1979
16 to 2019. (a) without folds, (b) with folds.

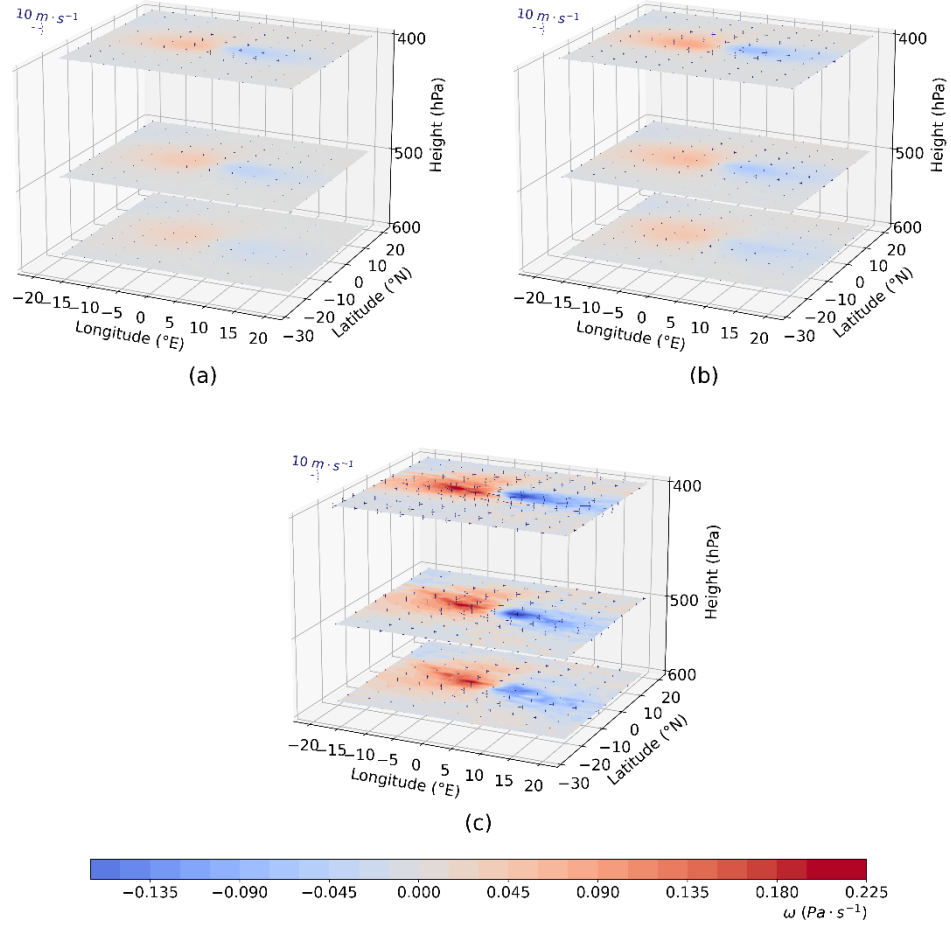


Figure S7: Horizontal distribution of vertical velocity anomalies (colored) and wind velocity anomalies (arrows) at heights of 400 hPa, 500 hPa, and 600 hPa in the UTLS region of the Qinghai-Tibet Plateau from 1979 to 2019. The latitude and longitude of the grid points represent the latitude and longitude relative to the lowest point of the fold. (a) shallow folds, (b) middle folds, and (c) deep folds.