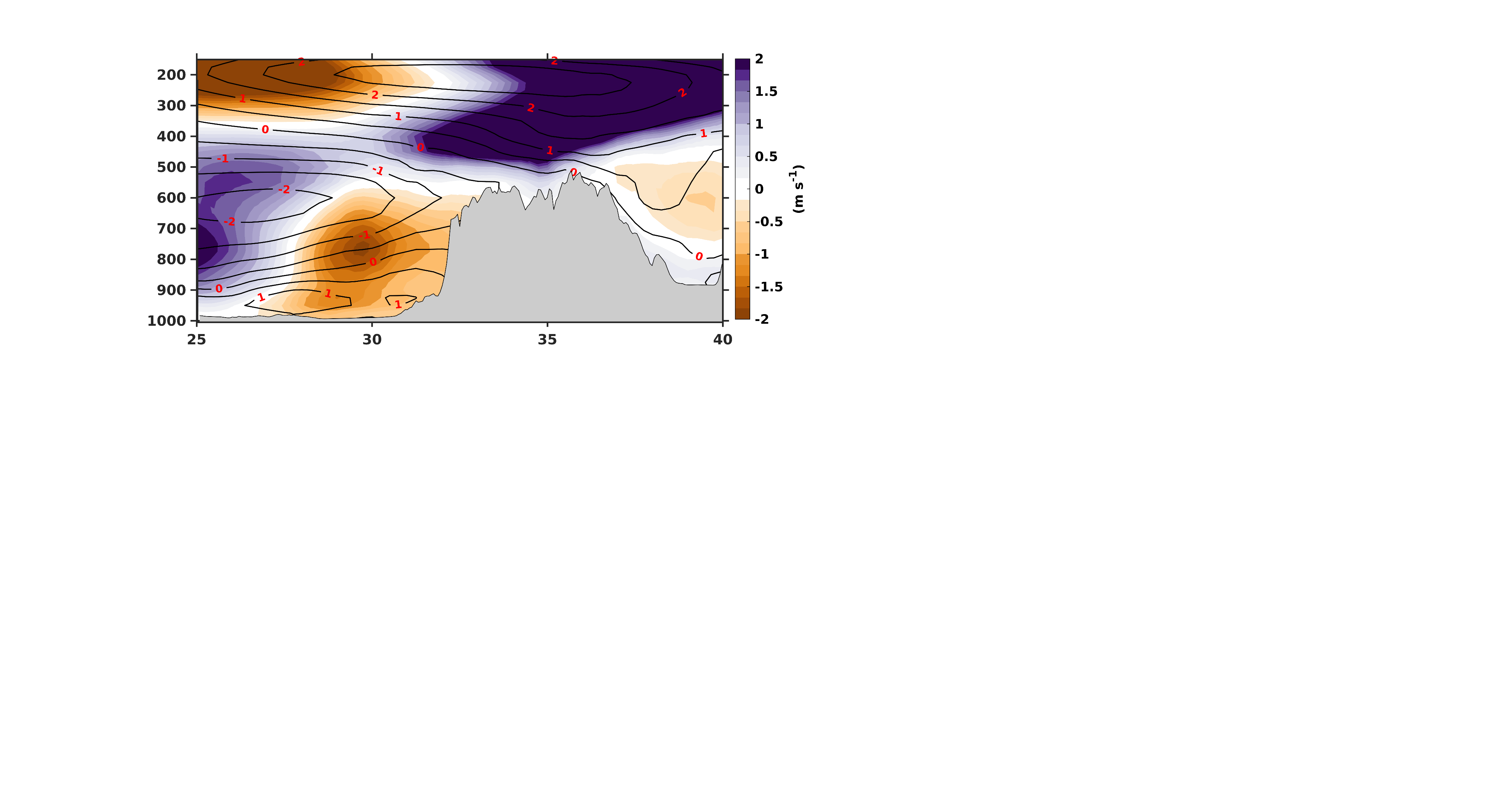
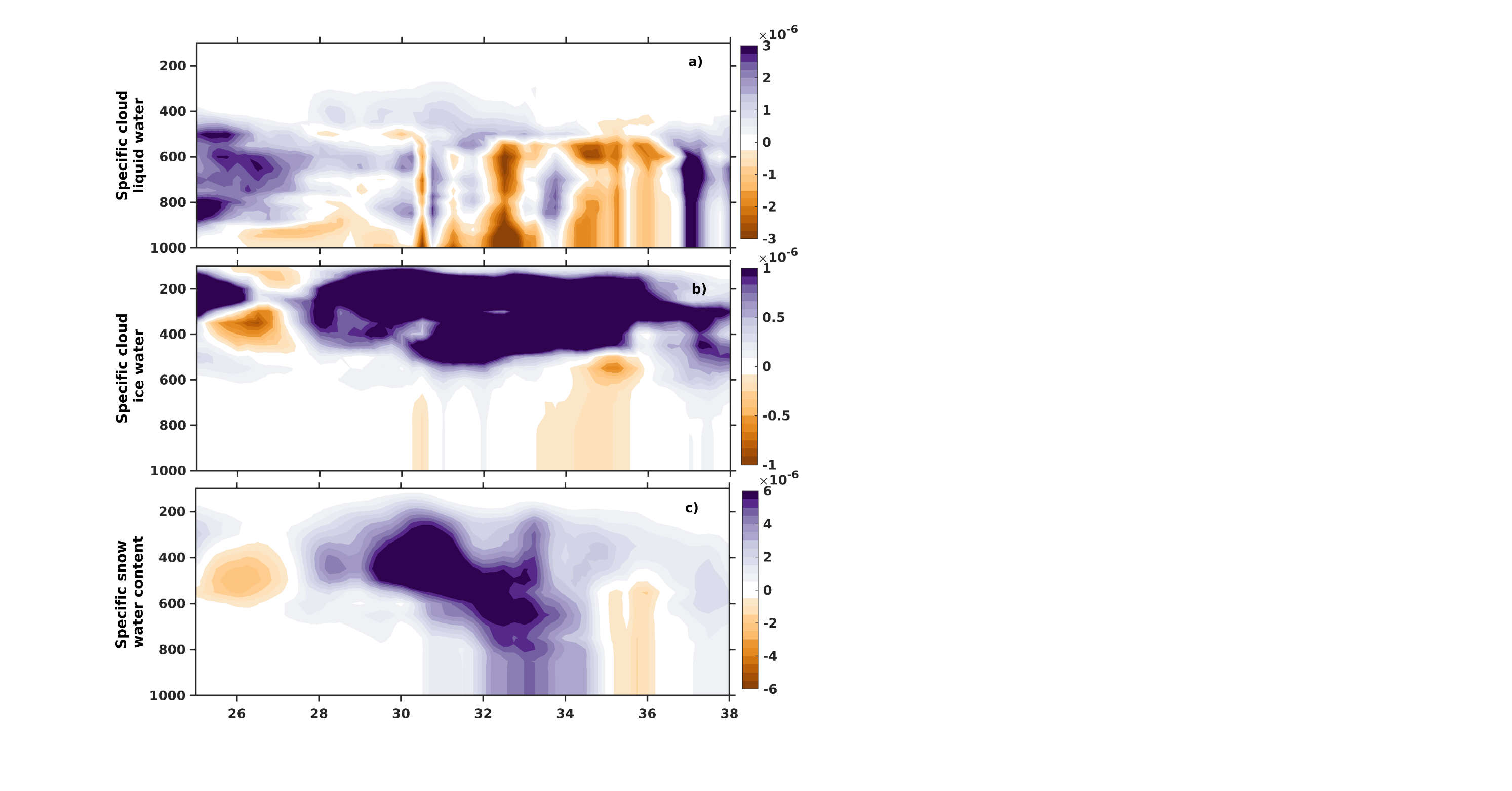


**Figure S1:** Composite anomalies of surface latent heat flux during ISM extreme precipitation events occurring over the Himalaya during 1979-2020.



**Figure S2:** Composites vertical-meridional cross-sections of zonal wind (shaded) and meridional wind (contours) (units: m s −1)



**Figure S3:** Composite vertical-zonal cross-sections of the anomalies of hydrometeors (a) specific cloud liquid water(b) specific cloud ice water and c) specific snow water content along 72°E‒82°E for ISM extreme precipitation events occurring over Himalayas.