S1 Spatial distribution of pathway contributions in the North Pacific

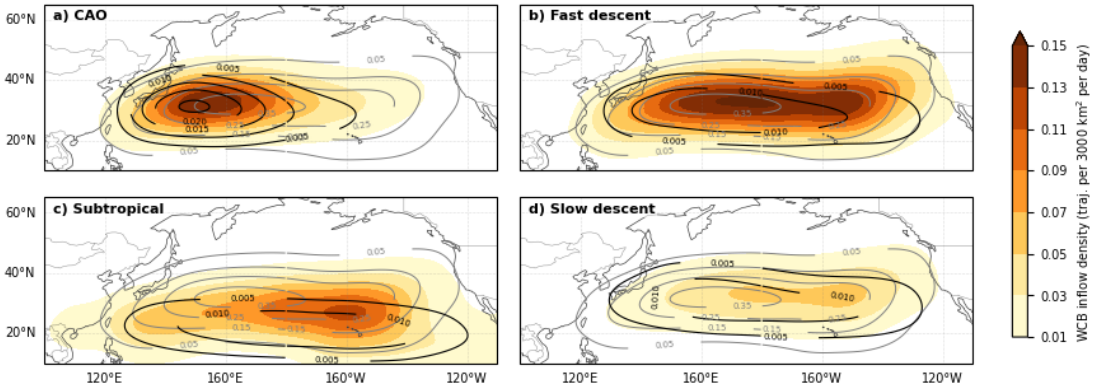

Figure S1: Climatological distribution of WCB inflow trajectory locations for (a) CAO, (b) fast descent, (c) subtropical origin, and (d) slow descent in the North Pacific. Gray contours show the distribution of all WCB inflow trajectories combined (0.05, 0.15, 0.25, 0.35 traj. per 3000 km^2 per day), while black contours indicate the moisture uptake density for each pathway (0.005 to 0.025 % per 3000 km^2 with 0.005 intervals).

S2 Spatial distribution of pathway decomposition

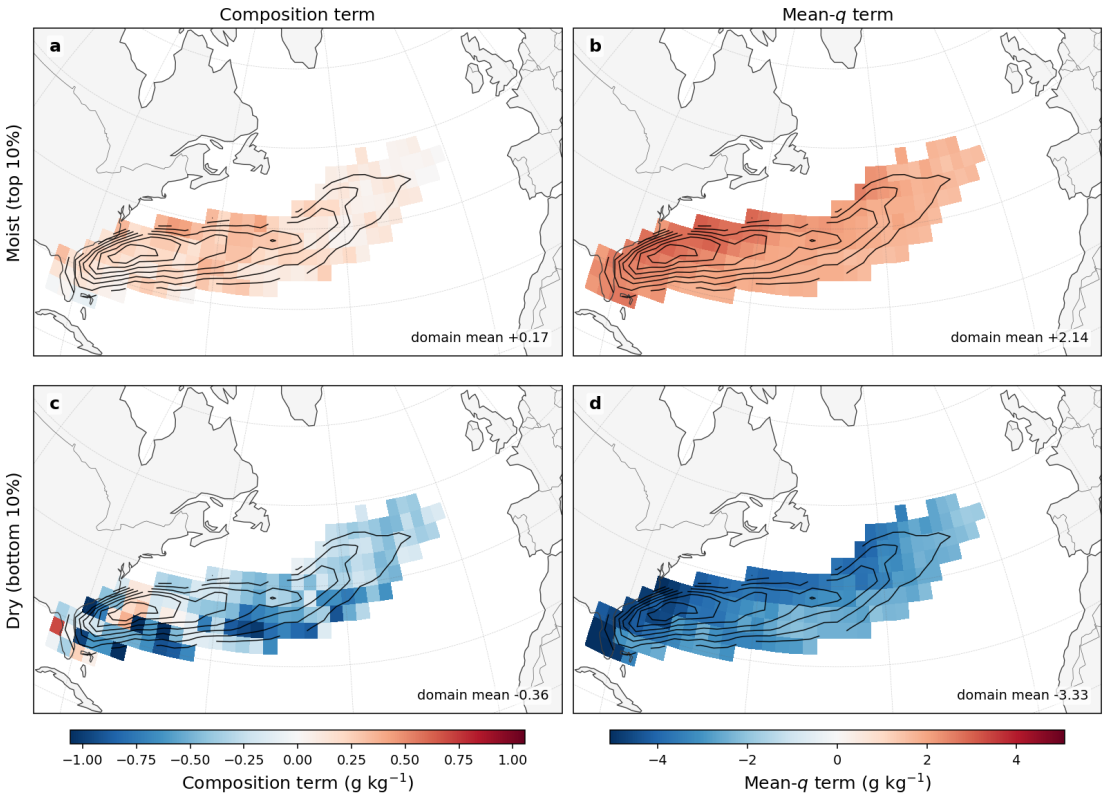

Figure S2: Spatial decomposition of the moist- and dry-tail difference in WCB inflow specific humidity. WCB objects are assigned by their weighted inflow center to overlapping 5° × 3° boxes on a 2° × 2° grid and ranked within each box by the local inflow-q anomaly; the top/bottom 10% tail is compared with the 40–60% average sample. Left (a, c): composition term; right (b, d): within-pathway mean-q term. Top (a, b): moist WCBs; bottom (c, d): dry WCBs. Shading in g kg^{-1}; red (blue) means the term makes the tail moister (drier) than the average sample. Color scales are shared within, but not across, columns; the number in each panel is the tail-object-weighted domain mean. Black contours (identical in all panels) show the total number of WCB objects per box, every 100 from 600 to 1100. Boxes with < 30 objects are blank.