Supplement of Atmos. Chem. Phys., 24, 8703–8720, 2024
https://doi.org/10.5194/acp-24-8703-2024-supplement

Atmospheric Chemistry and Physics Open Access

Supplement of

Elucidating the boundary layer turbulence dissipation rate using high-resolution measurements from a radar wind profiler network over the Tibetan Plateau

Deli Meng et al.

Correspondence to: Jianping Guo (jpguocams@gmail.com) and Xiaoran Guo (guoxiaoran2018@hotmail.com)

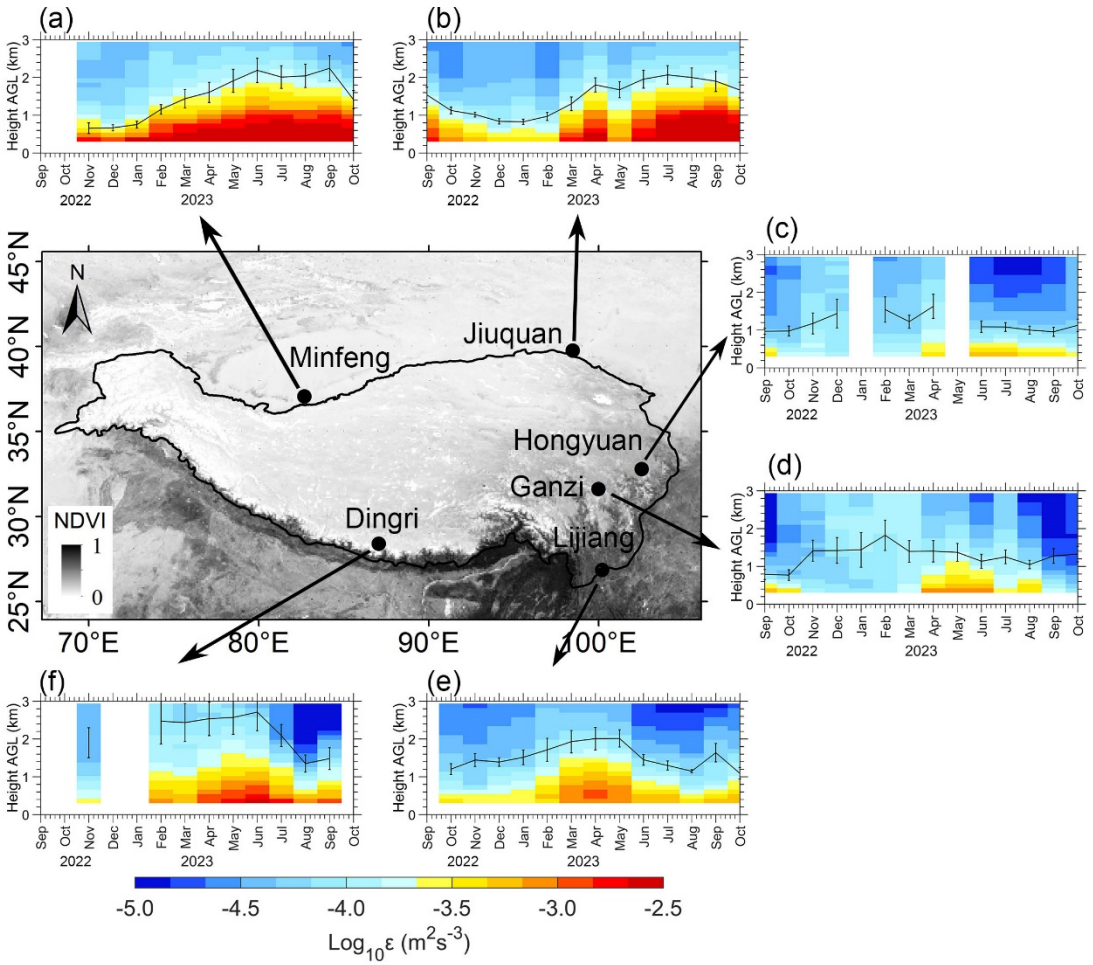

Figure S1. Spatial distribution of the monthly and seasonal evolution of the vertical profile of logarithmic turbulence dissipation rate ($Log_{10}\varepsilon$ in color shading, unit: $m^2\ s^{-3}$) at 120 m vertical resolution and 6 min intervals, and hourly mean planetary boundary layer height (z_i, black line, unit: km) during daytime under all-sky conditions from 0900 to 1700 local standard time (LST) for the period September 2022 to October 2023 as retrieved from the profiling measurements at six radar wind profiler (RWP) stations over the Tibetan Plateau (TP). The vertical bars indicate the 0.5 standard deviations for z_i.

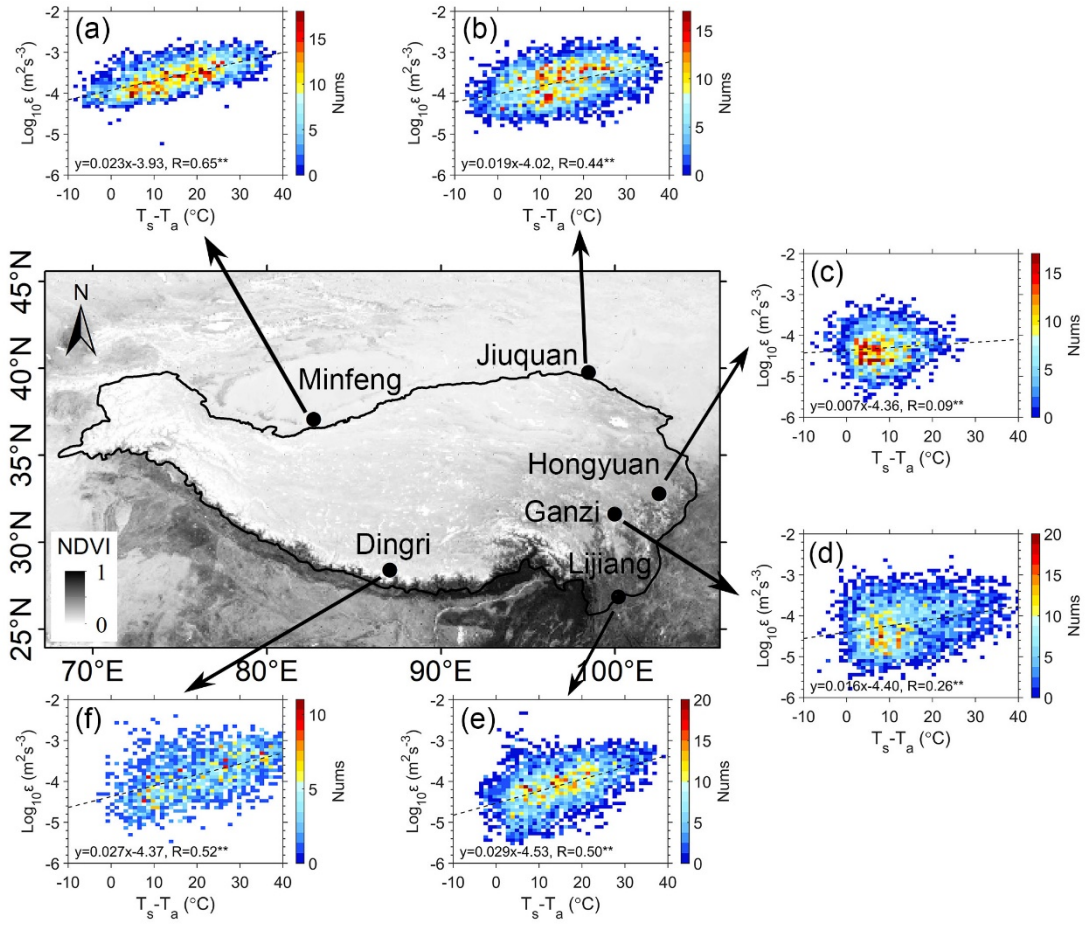

Figure S2. Scatter plots of $Log_{10}\varepsilon$ at heights from 0.5 to 3.0 km as a function of $T_s - T_a$ at six RWP stations over the TP during daytime under all-sky conditions from 0900 to 1700 LST for the period September 2022 to October 2023. The superscript ** for R indicates that the regression slope is statistically significant at $p < 0.01$ level.

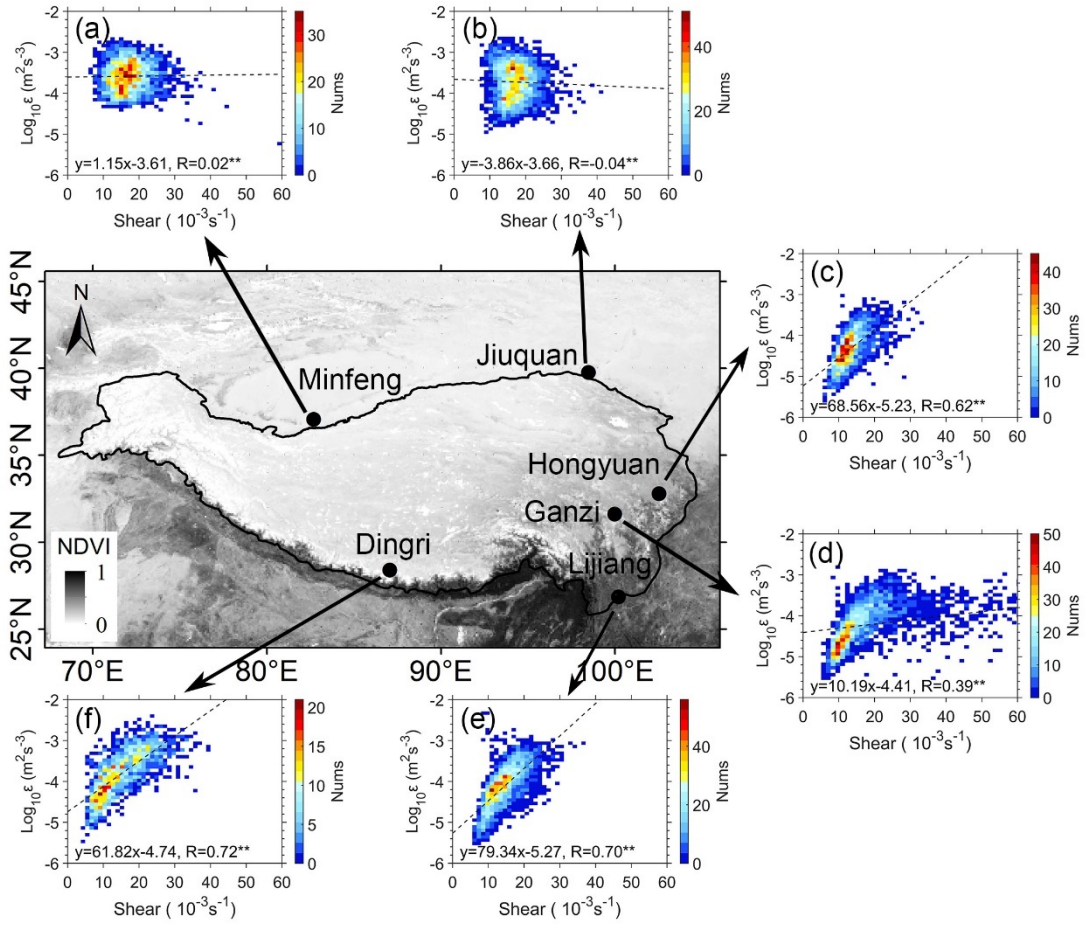

Figure S3. Scatter plots of $Log_{10}\varepsilon$ at heights from 0.5 to 3.0 km as a function of vertical wind shear (VWS) at six RWP stations over the TP during daytime under all-sky conditions from 0900 to 1700 LST for the period September 2022 to October 2023. The superscript ** for R indicates that the regression slope is statistically significant at $p < 0.01$ level.

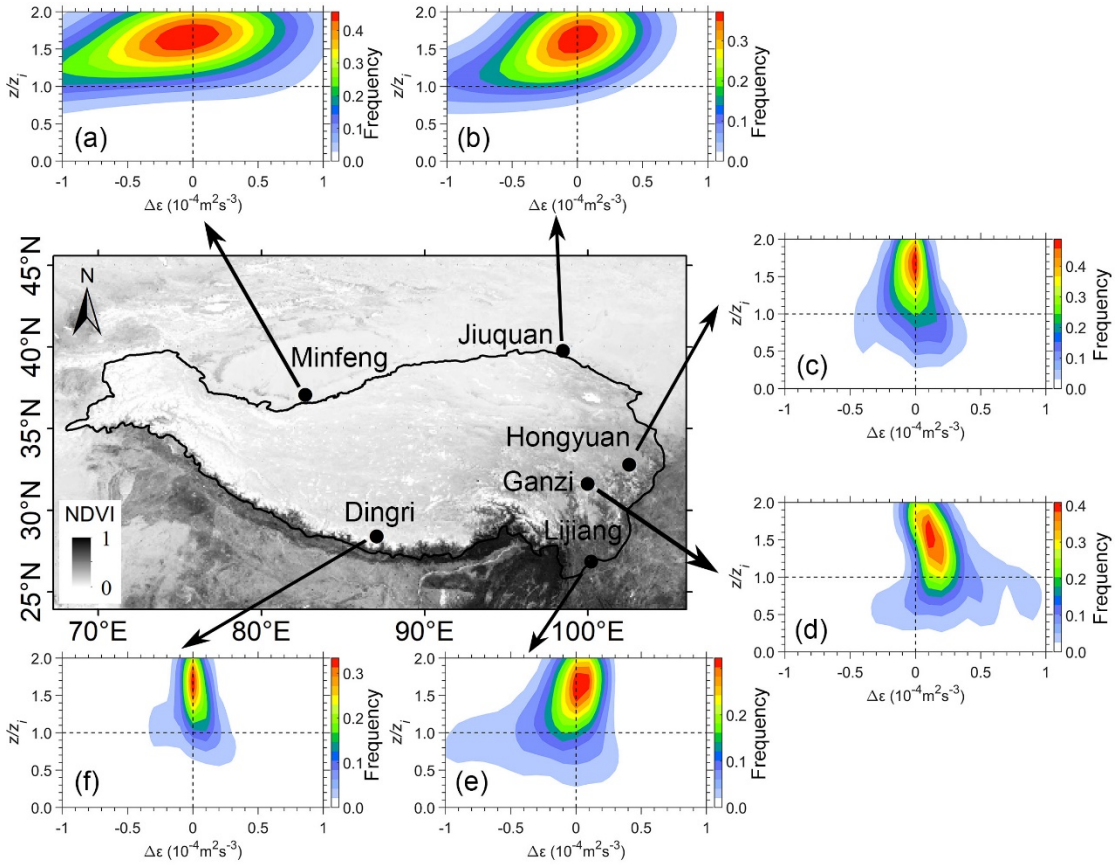

Figure S4. Normalized contoured frequency by altitude diagram (NCFAD) for the difference of ε between cloudy-sky and clear-sky conditions (Δε) at six RWP stations over the TP from 0900 to 1700 LST for the period September 2022 to October 2023. Note that z_i denotes the depth of the planetary boundary layer (PBL), the height (z) is normalized by z_i in order to give a nondimensional vertical coordinate in the form of z/z_i.

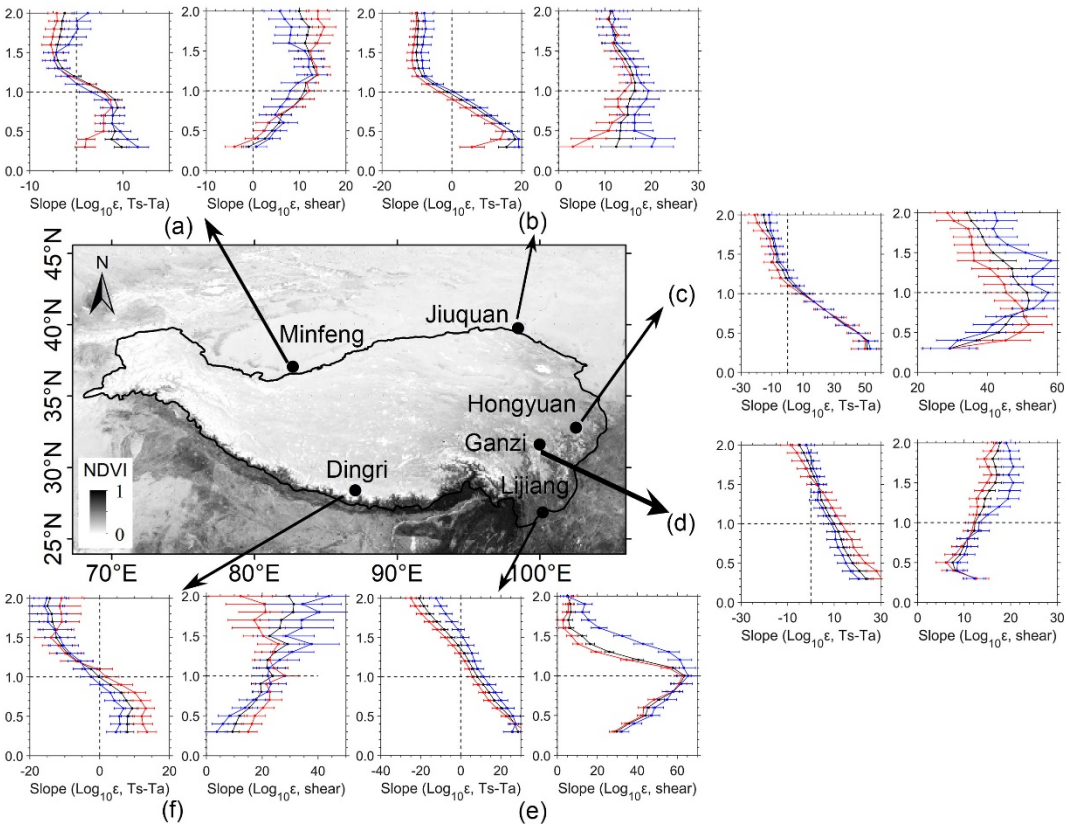

Figure S5. The vertical profiles of least squares regression slope between $\mathrm{Log_{10}\varepsilon}$ and $\mathrm{T_s - T_a}$ and VWS under all-sky (black), clear-sky (red) and cloudy-sky (blue) conditions at six RWP stations over the TP from 0900 to 1700 LST for the period September 2022 to October 2023. Note that $\mathrm{z_i}$ denotes the depth of the PBL, the height (z) is normalized by $\mathrm{z_i}$ in order to give a nondimensional vertical coordinate in the form of $\mathrm{z/z_i}$.