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Separating the Twomey effect and the semi-direct effect in absorbing aerosol environments through the cloud-aerosol mixing ratio

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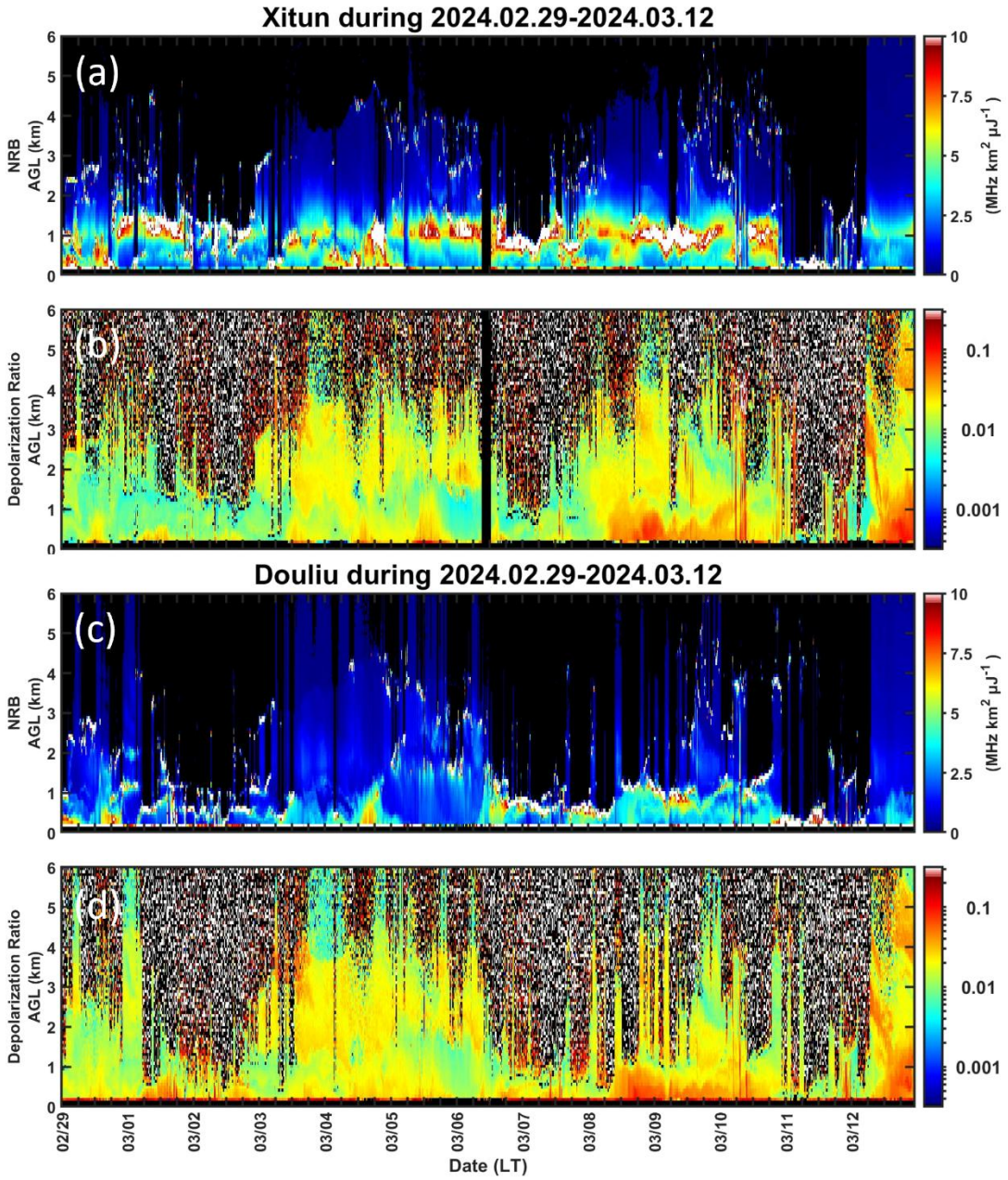

Figure S1: Lidar observations at the Xitun site (24.16°N, 120.62°E) and Douliu site (23.71°N, 120.54°E) of the Taiwan Ministry of Environment from 29 February to 12 March 2024. Panels (a) and (c) represent the normalized relative backscatter (NRB) profile, while panels (b) and (d) show the depolarization ratio.

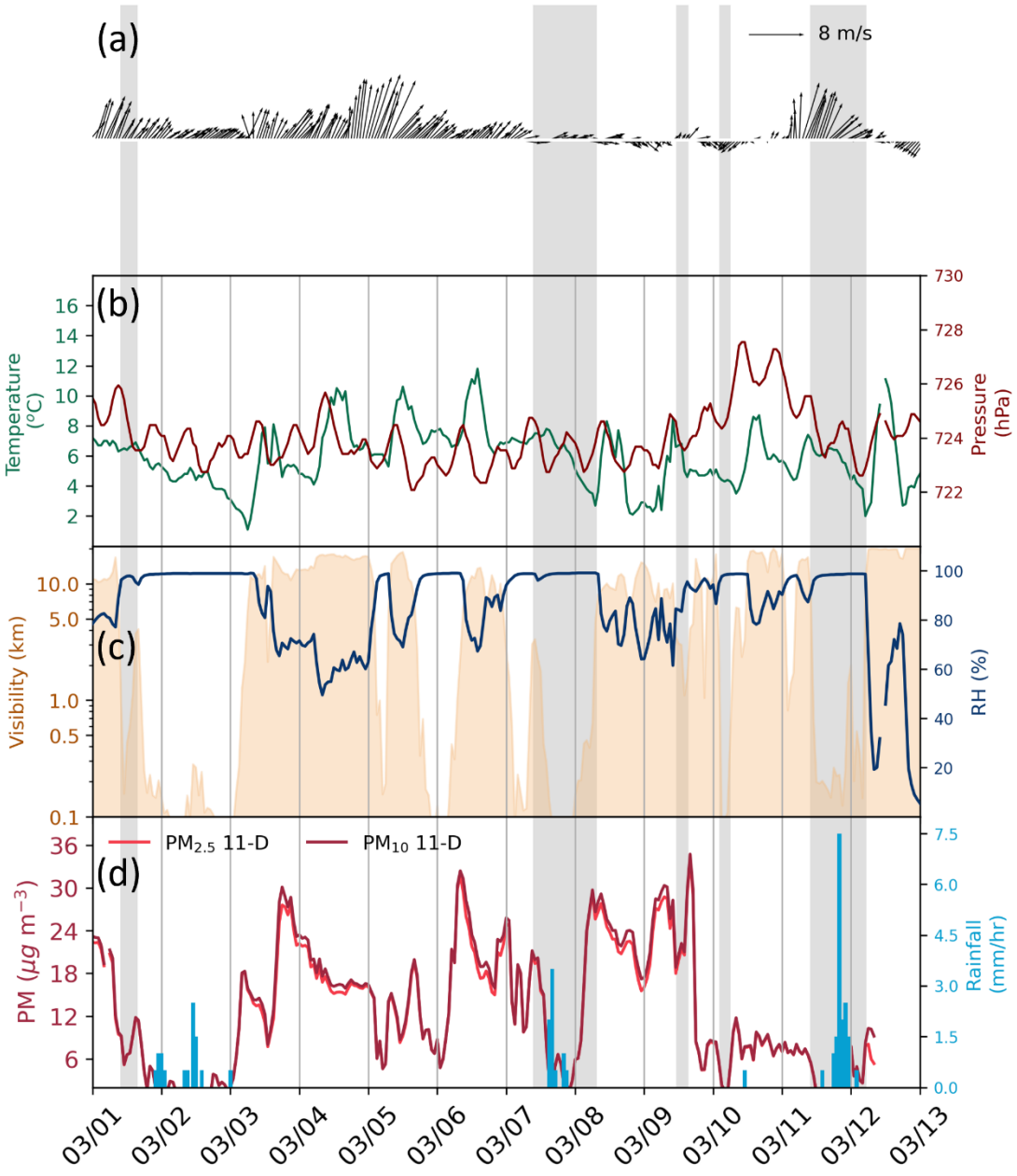

Figure S2: Hourly averages of meteorological parameters and aerosol mass concentrations observed at LABS from March 1 to 12, 2024: (a) wind speed and direction; (b) temperature (green) and pressure (red); (c) visibility (orange) and relative humidity (dark blue); (d) PM10 (dark red) and PM2.5 (red) measured by the 11-D instrument, along with hourly precipitation (light blue bars).

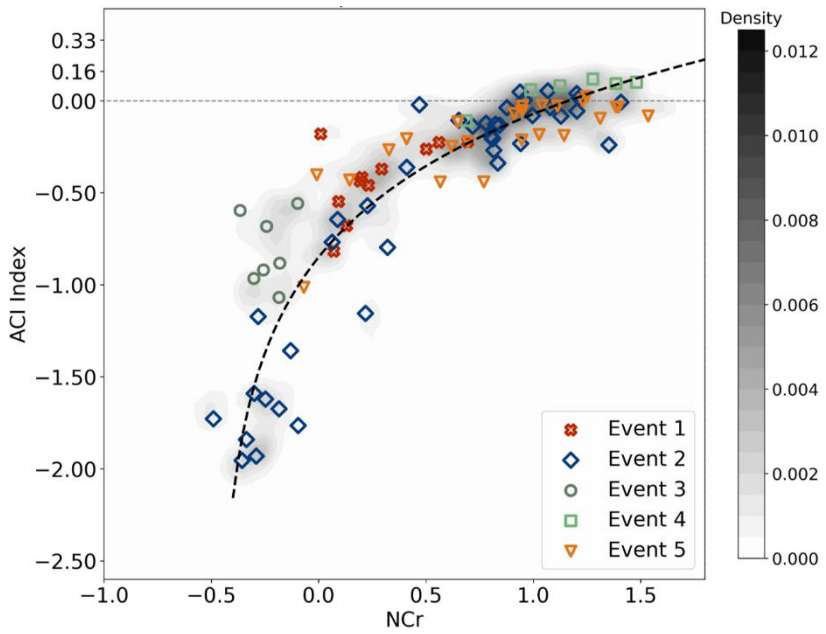

Figure S3: Scatter and density plots of the NCr-ACI index for the continuous cloud events. The density plot illustrates the overall distribution of all calculated results, while the scatter plot shows the distribution of individual cloud events using different colors and symbols (one point shown for every 30 calculations).

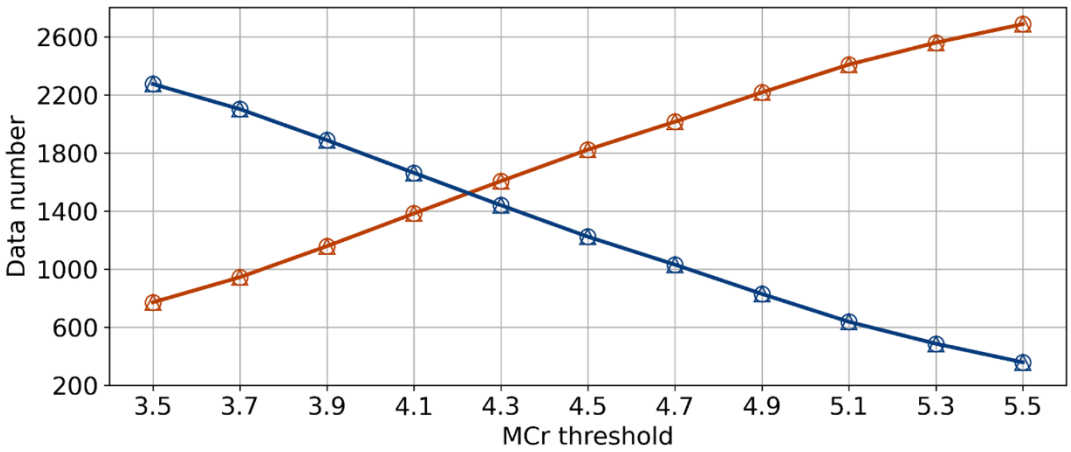

Figure S4: Number of data points within different MCr threshold intervals in Figure 8. Blue markers represent data subsets with MCr values above the given threshold, while red markers indicate those below it. Circles correspond to calculations using $PM_{2.5}$ as α, and triangles denote those using N_a as α.