

Supplementary material

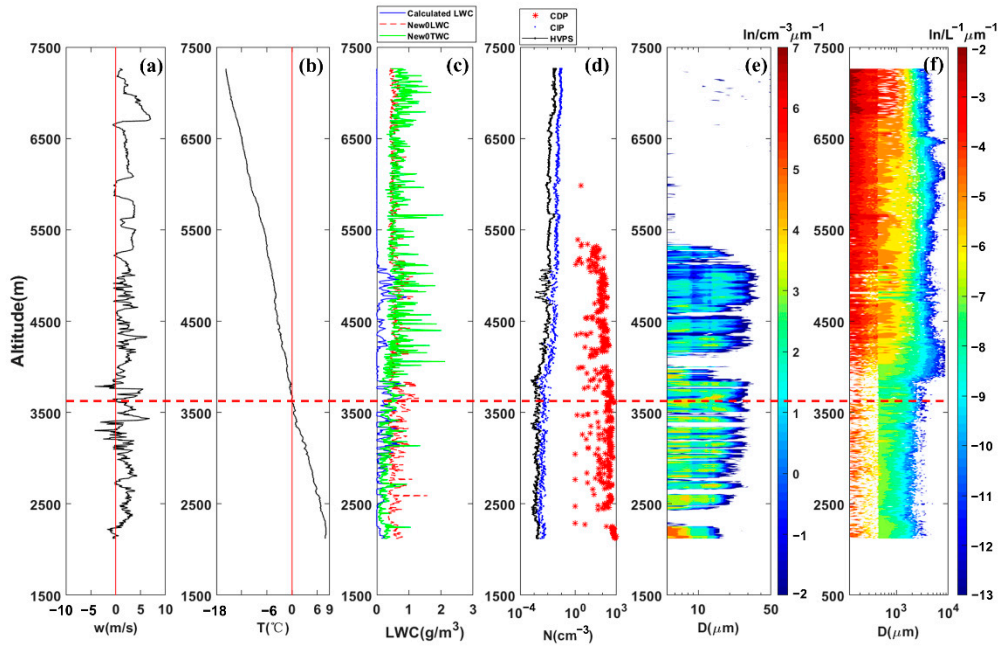


Figure S1. The aircraft observation data set of V2 on 22 May 2017 in the convective cell, (a) vertical velocity (the red line is 0, units: m s^{-1} , $^{\circ}\text{C}$); (b) temperature (units: $^{\circ}\text{C}$, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 $^{\circ}\text{C}$ layer.

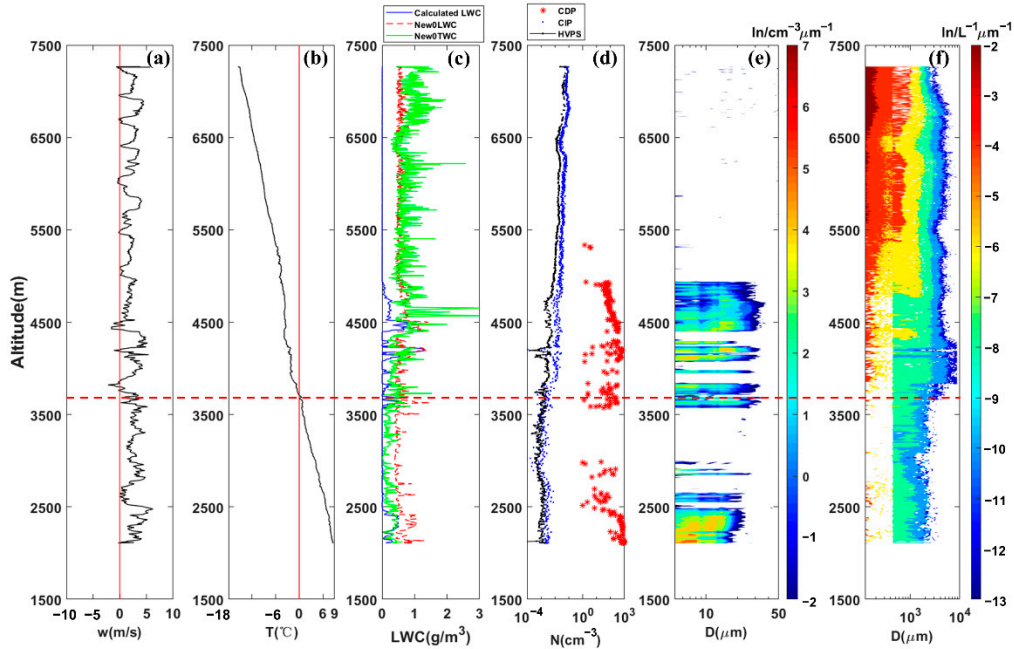


Figure S2. The aircraft observation data set of V3 on 22 May 2017 in the convective cell, (a) vertical velocity (the red line is 0, units: m s^{-1} , $^{\circ}\text{C}$); (b) temperature (units: $^{\circ}\text{C}$, the red line is 0);

(c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 $^{\circ}\text{C}$ layer.

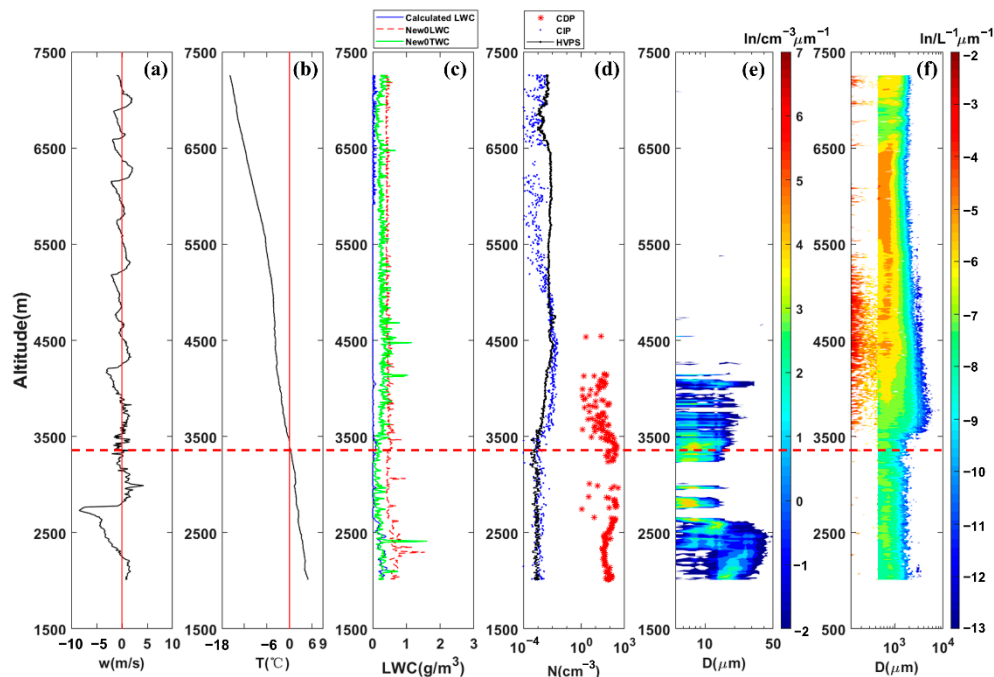


Figure S3. The aircraft observation data set of V5 on 22 May 2017 in the stratiform cloud area, (a) vertical velocity (the red line is 0, units: m s^{-1} , $^{\circ}\text{C}$); (b) temperature (units: $^{\circ}\text{C}$, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 $^{\circ}\text{C}$ layer.

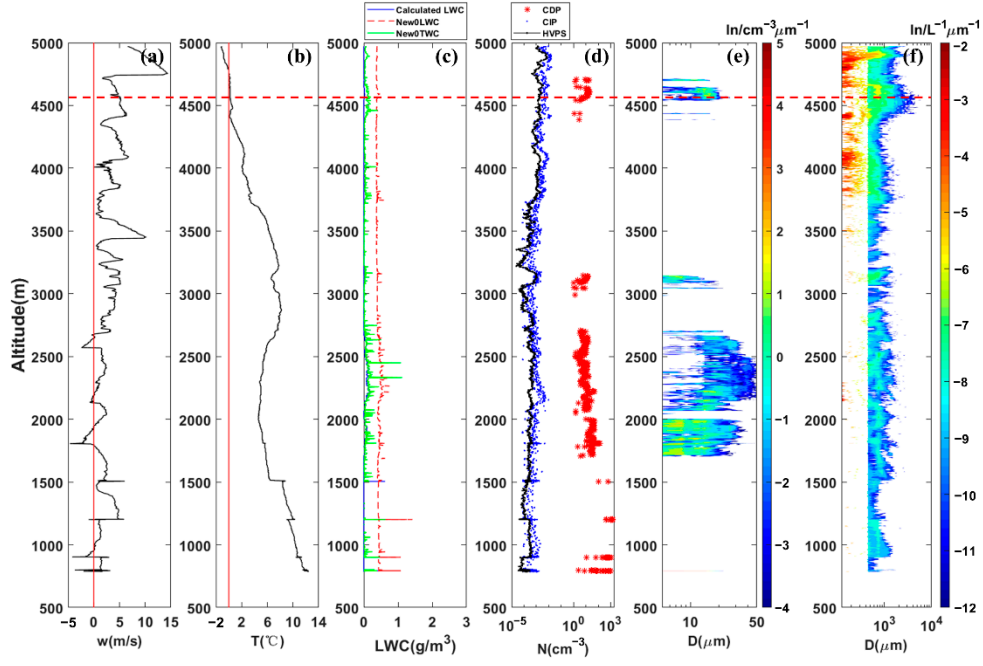


Figure S4. The aircraft observation data set of V1 on 21 May 2018 in the convective cell, (a) vertical velocity (the red line is 0, units: m s^{-1} , $^{\circ}\text{C}$); (b) temperature (units: $^{\circ}\text{C}$, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 $^{\circ}\text{C}$ layer.

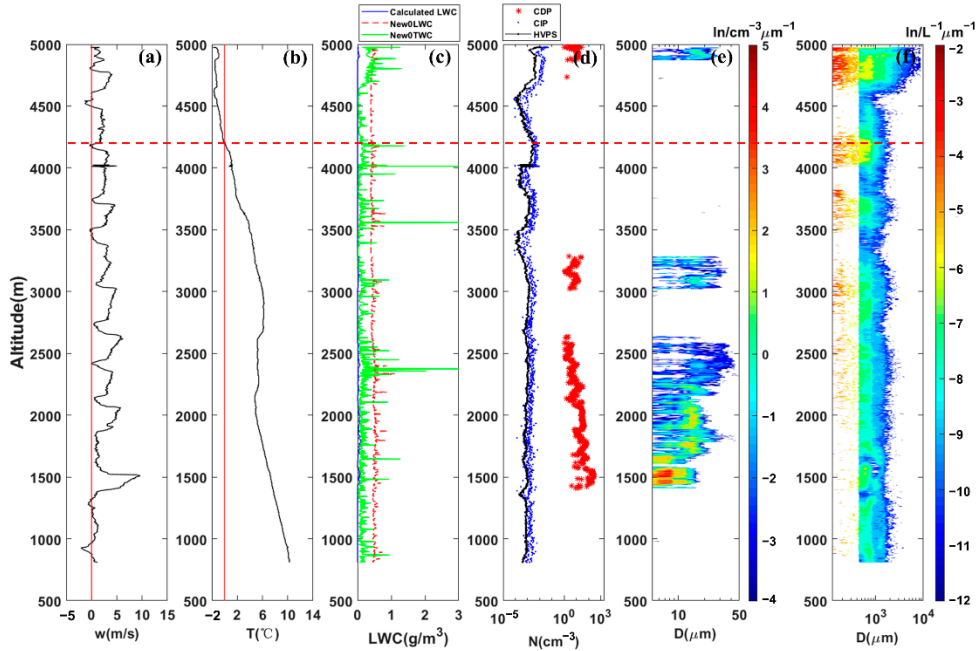


Figure S5. The aircraft observation data set of V2 on 21 May 2018 in the stratiform cloud area, (a) vertical velocity (the red line is 0, units: m s^{-1} , $^{\circ}\text{C}$); (b) temperature (units: $^{\circ}\text{C}$, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content

(New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 °C layer.

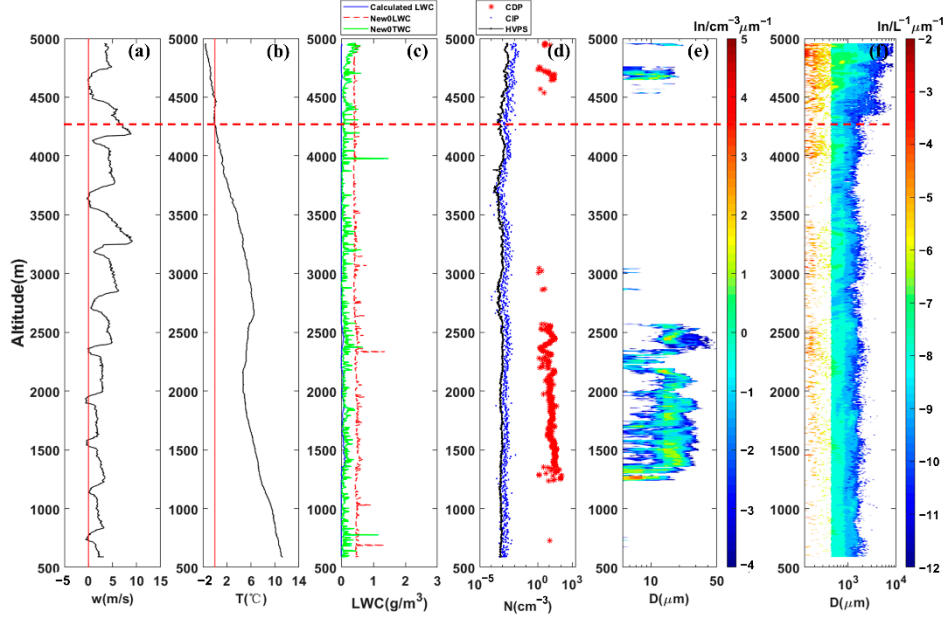


Figure S6. The aircraft observation data set of V3 on 21 May 2018 in the stratiform cloud area, (a) vertical velocity (the red line is 0, units: m s^{-1} , °C); (b) temperature (units: °C, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 °C layer.

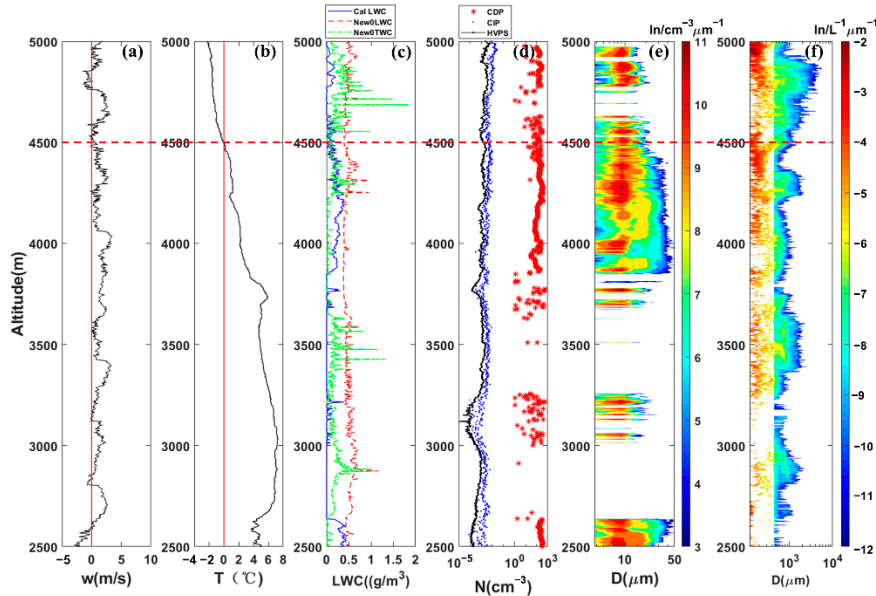


Figure S7. The aircraft observation data set of V4 on 24 August 2019 in the stratiform cloud area, (a) vertical velocity (the red line is 0, units: m s^{-1} , °C); (b) temperature (units: °C, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 °C layer.

0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 $^{\circ}\text{C}$ layer.

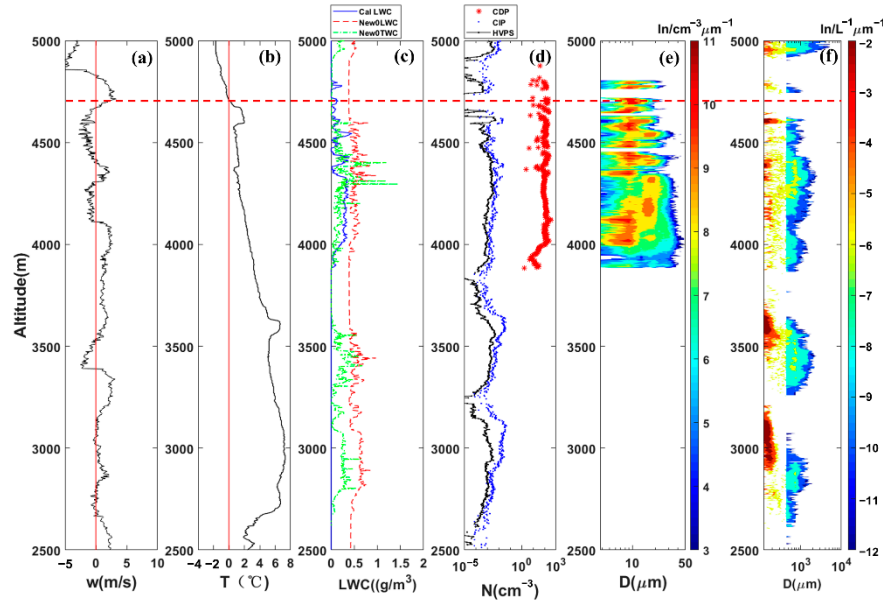


Figure S8. The aircraft observation data set of V8 on 24 August 2019 in the stratiform cloud area, (a) vertical velocity (the red line is 0, units: m s^{-1} , $^{\circ}\text{C}$); (b) temperature (units: $^{\circ}\text{C}$, the red line is 0); (c) calculated liquid water content (calculated LWC), probe detected liquid water content (New0LWC), probe detected total water content (New0TWC) (units: g m^{-3}); (d) particle number concentration of the CDP, the CIP, and the HVPS (units: cm^{-3}); (e) particle spectrum of CDP (units: $\text{cm}^{-3}\mu\text{m}^{-1}$); (f) particle spectrum of the CIP (100–400 μm) and the HVPS (400–8700 μm) (units: $\text{L}^{-1}\mu\text{m}^{-1}$). The red dotted line is the 0 $^{\circ}\text{C}$ layer.