

Natural new particle formation at the coastal Antarctic site Neumayer

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SUPPLEMENTARY MATERIAL

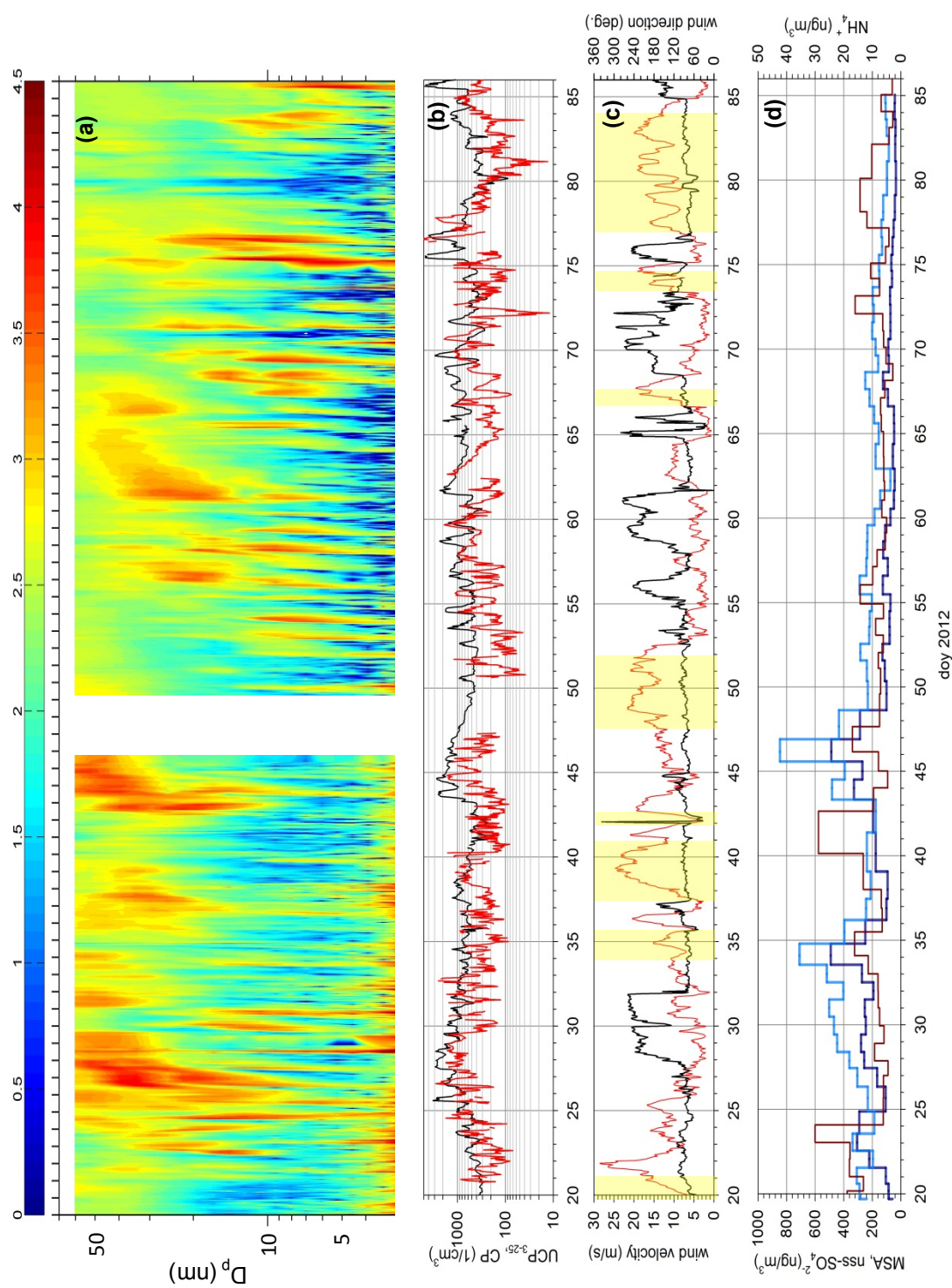


Figure S.1. Time series of the measured particle size distribution $dN/d\log D_p$ (cm^{-3}) during summer 2012 on a logarithmic scale (color code on top of the contour plot (a)), corresponding CP concentration (black line) and ultrafine particle concentrations between 3 nm and 25 nm (UCP_{3-25} , red line) (b), wind velocity (red line) and wind direction (black line) (c), and ionic composition of bulk aerosol (nss- SO_4^{2-} , dark blue line; MSA, cyan blue line; NH_4^+ , red line) (d). The concentration of non-sea salt sulfate (nss- SO_4^{2-}) was calculated according to Piel et al. (2006). The yellowish shaded areas in (c) mark stormy weather conditions associated with snow drift.

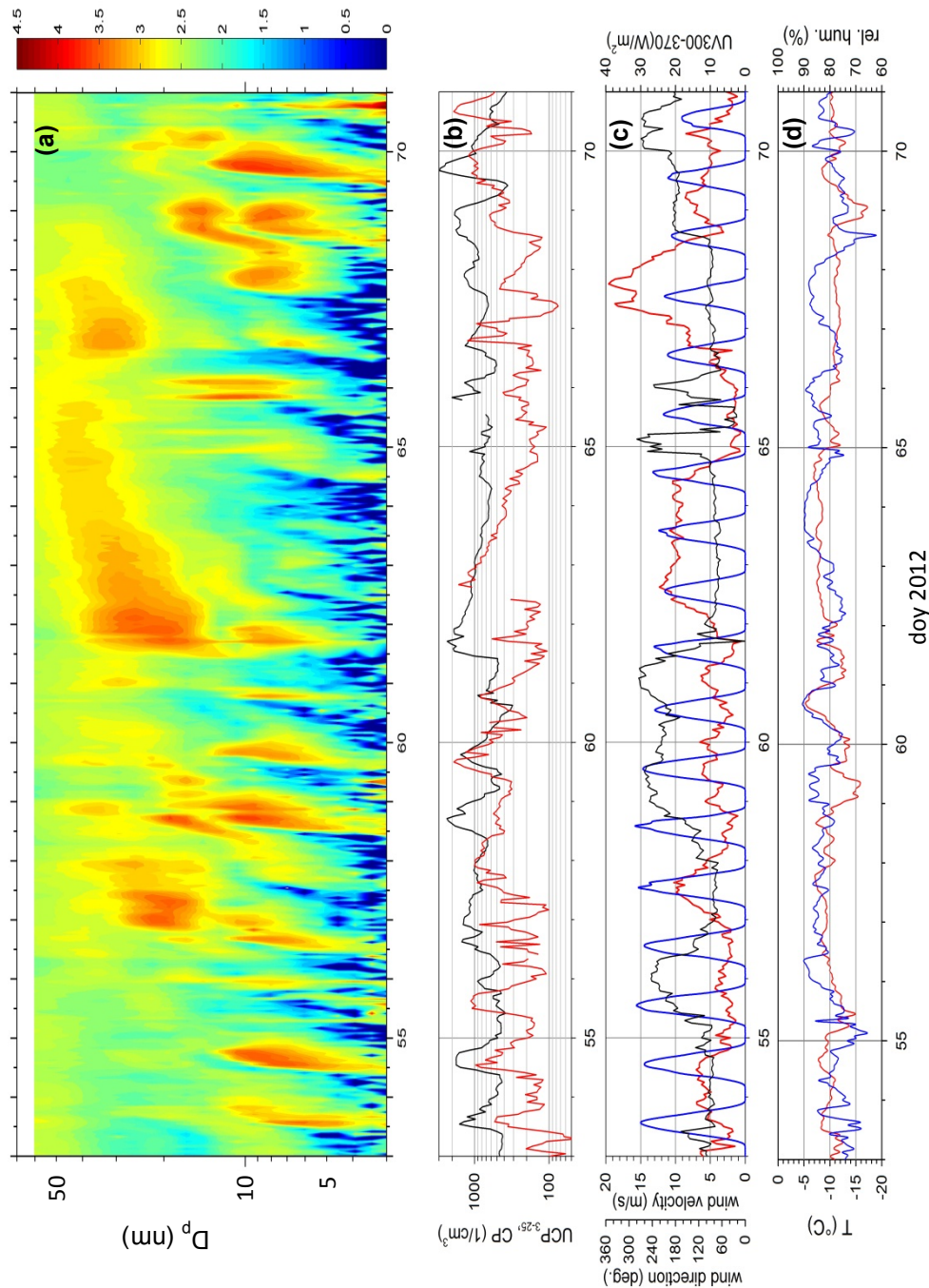


Figure S.2. Time series of particle size distribution (same description as in Fig. 1a) from an episode with consecutive NPF (a), corresponding CP concentration (black line) and particle concentrations between 3 nm and 25 nm (UCP₃₋₂₅, red line) (b), wind velocity (red line) and wind direction (black line) and UV radiation at wavelengths between 300 nm and 370 nm (blue line) (c), temperature (red line) and relative humidity (blue line) (d).

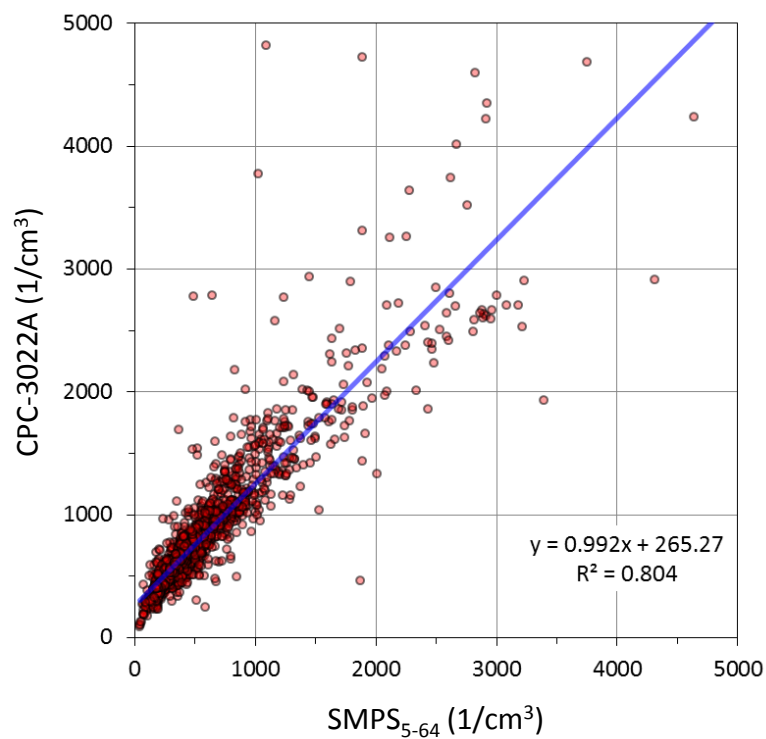


Figure S.3. Scatter plot of CP concentrations measured by the condensation particle counter CPC 3022A (cut-off $D_{p(50\%)} = 7$ nm) versus total particle concentration between 5 nm and 65 nm measured by the SMPS.

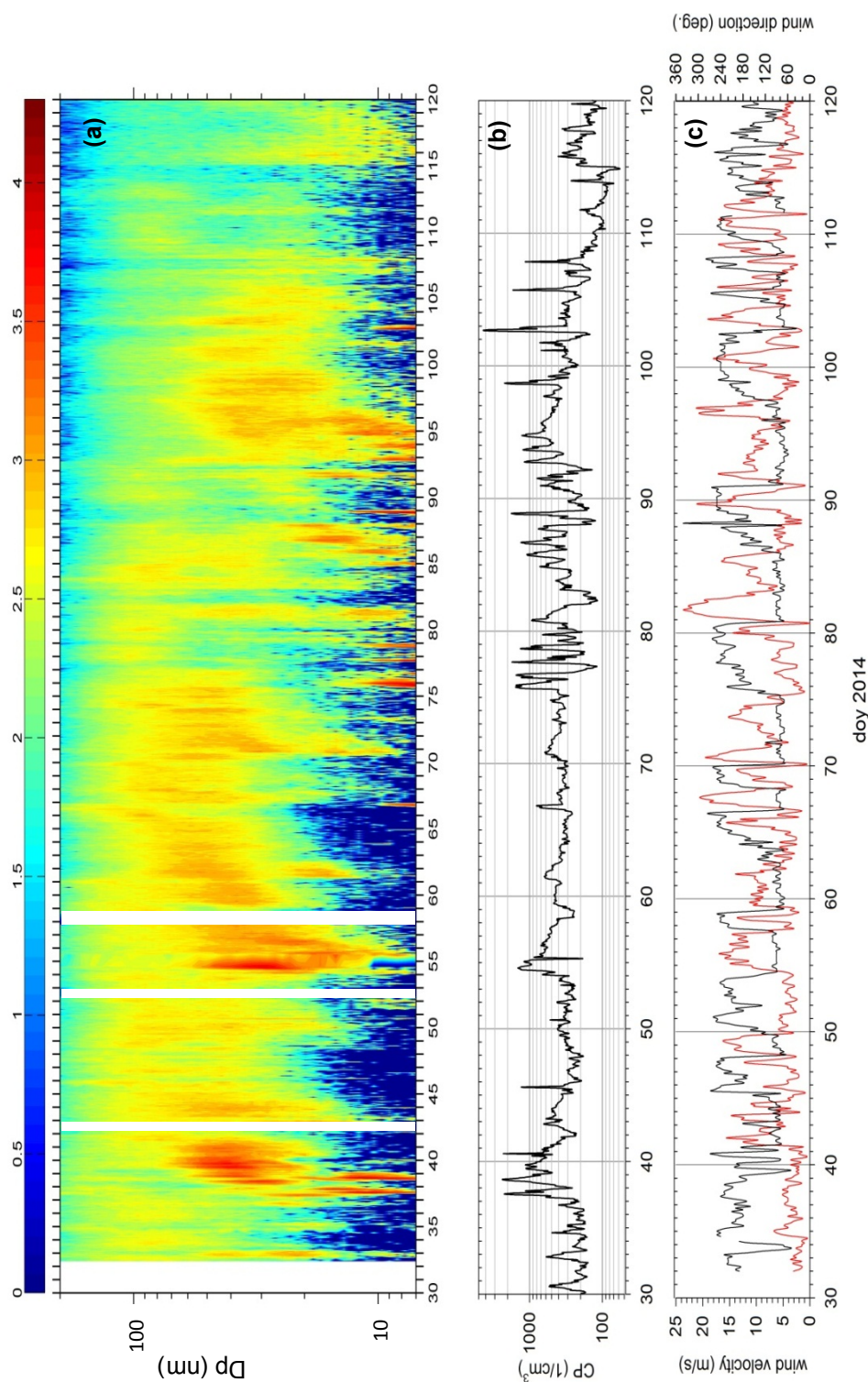


Figure S.4. Time series of the measured particle size distribution $dN/d\log D_p$ (cm^{-3}) during summer 2014 on a logarithmic scale (color code on top of the contour plot) (a), CP concentration (b), wind velocity (red line) and wind direction (black line) (c).

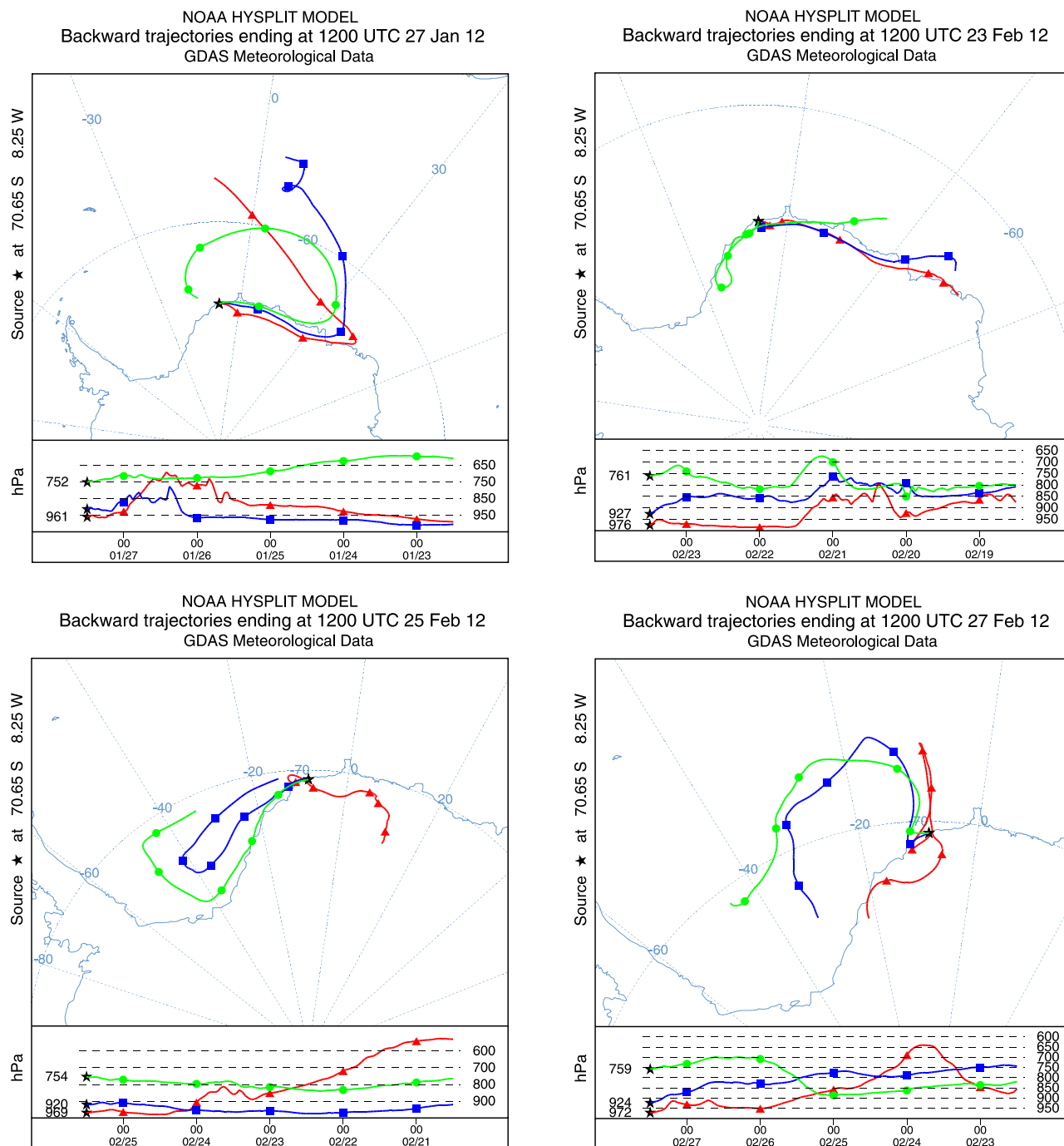


Figure S.5. Five-days back trajectories for days with NPF associated with determinable growth rates. Trajectories were calculated for three different arrival heights: 100 m, 500 m, and 2000 m. The first two height levels were usually within the well mixed PBL, while the highest level was within the free troposphere.

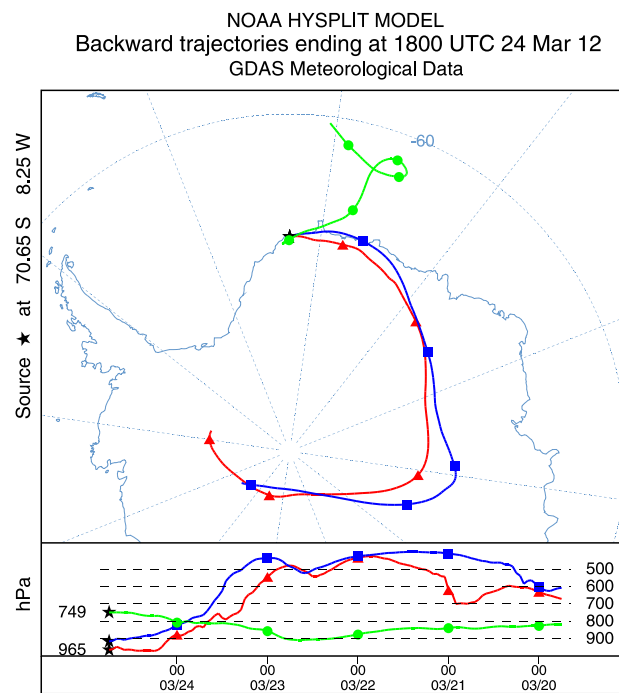
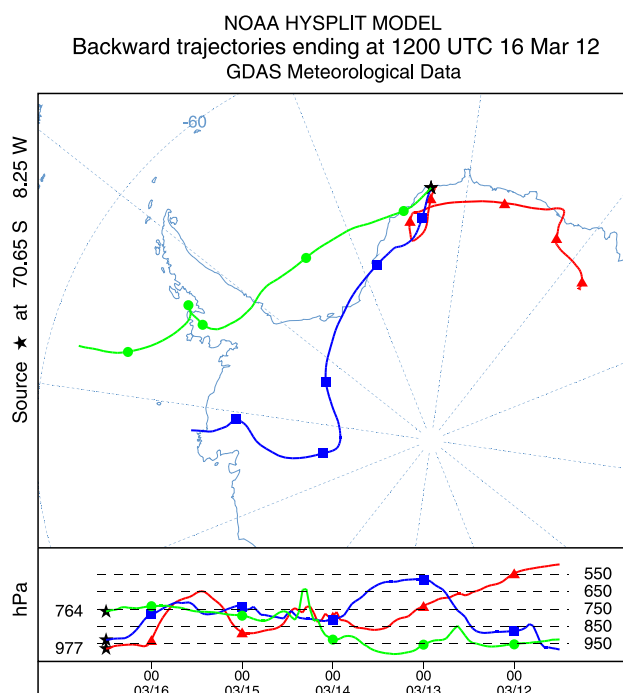
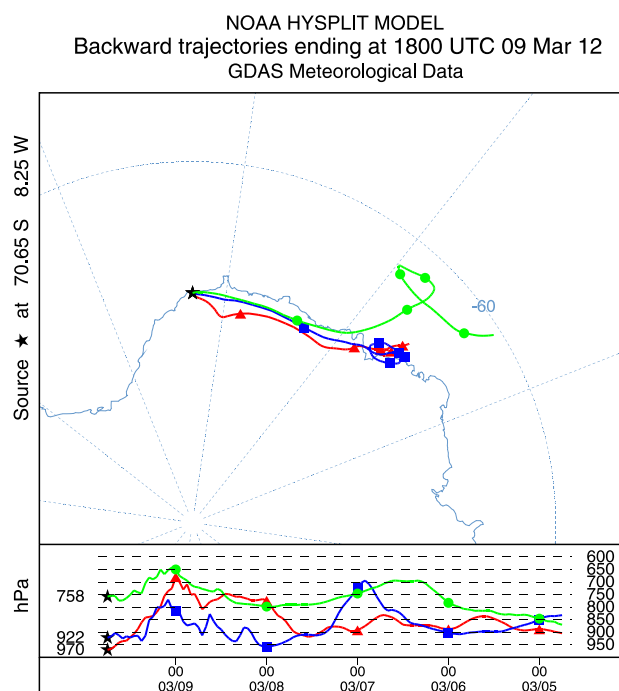
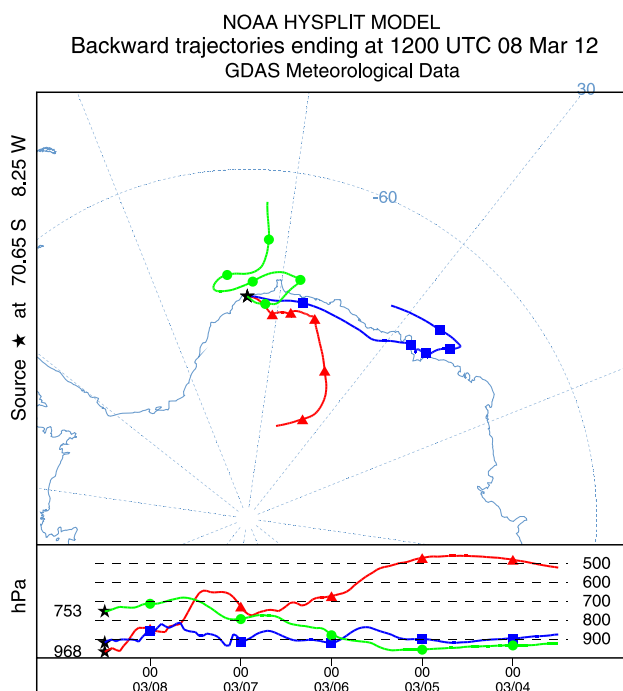


Figure S.5. Continued.

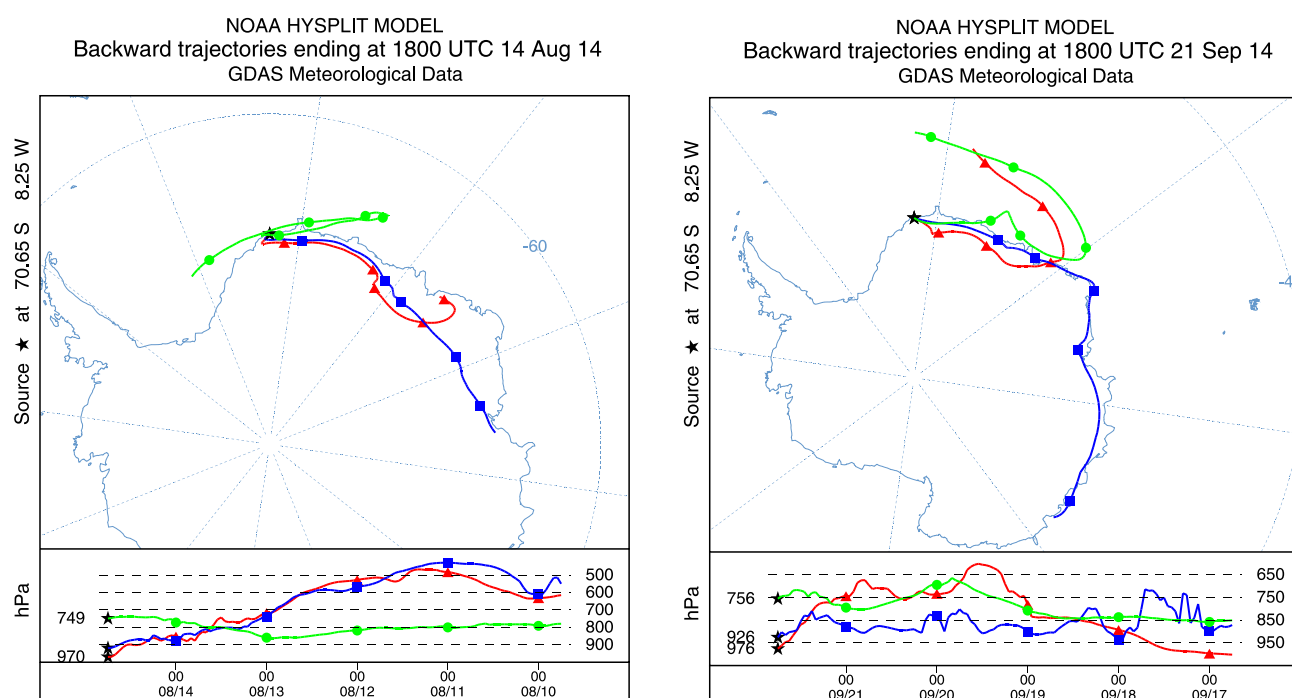


Figure S.6. Five-days back trajectories for the detected particle nucleation events during winter (14/15 August and 21 September). Trajectories were again calculated for three different arrival heights: 100 m, 500 m, and 2000 m. The mixing depths were around 160 m and around 430 m during the first and second event, respectively.