Size distribution and size segregated ionic composition of the aerosol at the continental Antarctic site Kohnen (75°00'S, 00°04'E)

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SUPPLEMENTARY MATERIAL
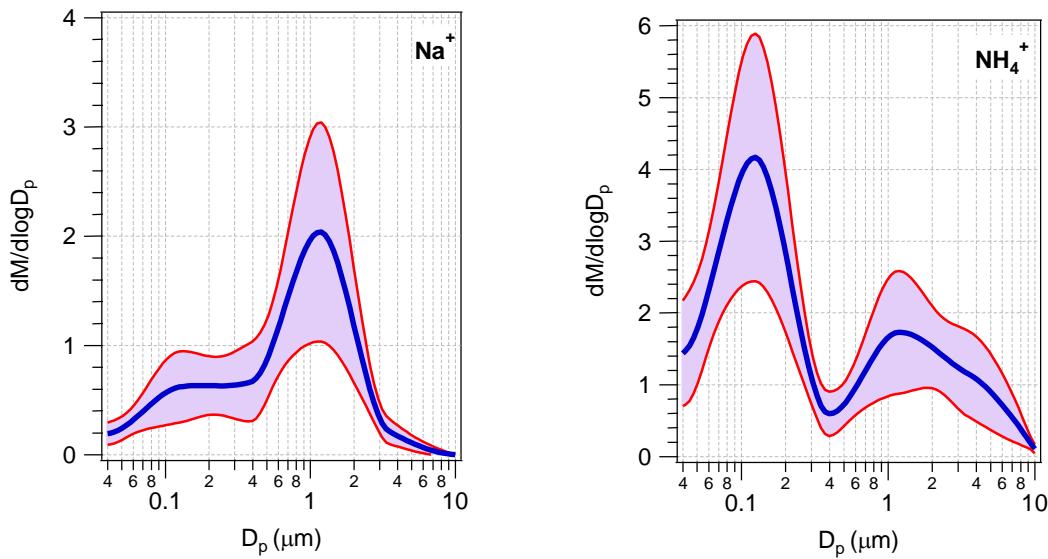
Figure S.1. Mean inverted size distributions (blue lines) and the confidence intervals (red lines) determined for the two most critical cases, i.e. NH_4^+ of impactor #1 and Na^+ of impactor #4 from the campaign in 2015. We run a Monte Carlo simulation, with 1000 realization of the inversion, independently varying the concentrations of each impactor stage within two STD of the experimental error (using individual concentration dependent errors derived from the exponential fit in Fig. 2).
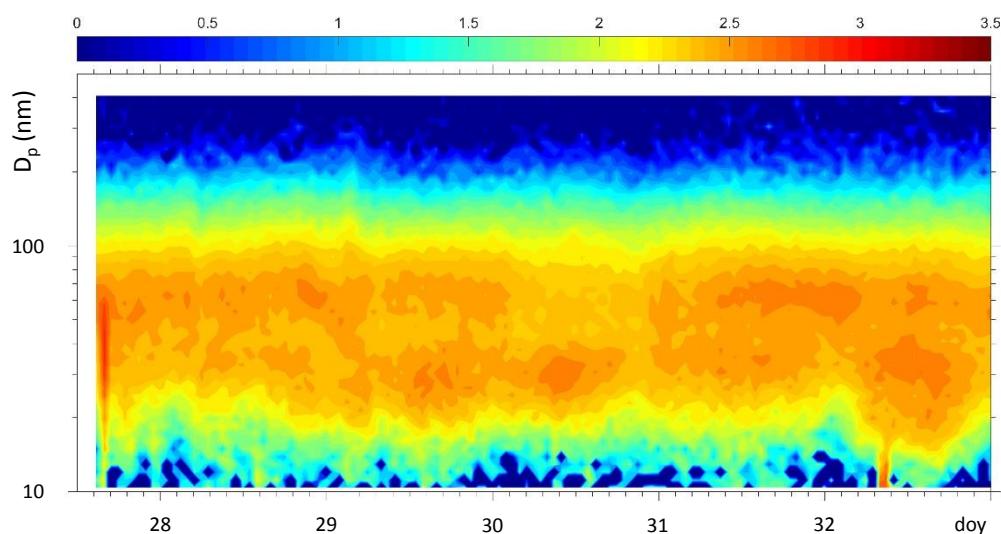
Figure S.2. Time series of the measured particle size distribution dN/dlogDp (cm⁻³) during summer 2015 measured with the DMA 3081 on a logarithmic scale (color code on top of the contour plot)
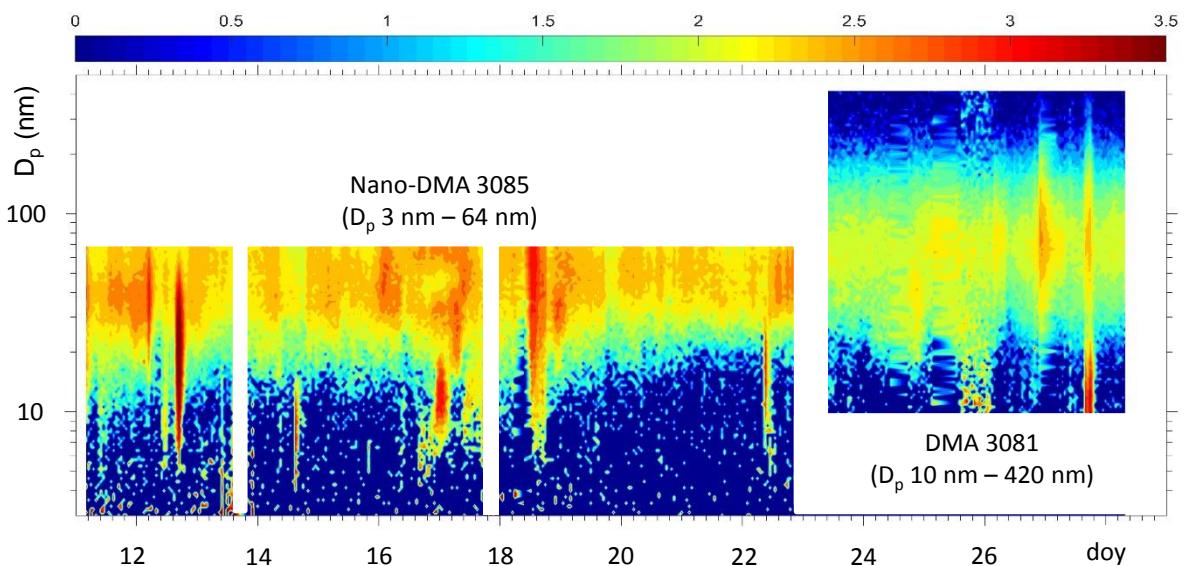
Figure S.3. Time series of the measured particle size distribution dN/dlogDp (cm⁻³) during summer 2016 on a logarithmic scale (color code on top of the contour plot). The horizontal blanked areas mark the size restriction of the corresponding DMA, while the vertical blanked areas were instrumental failures due to power breakdown.
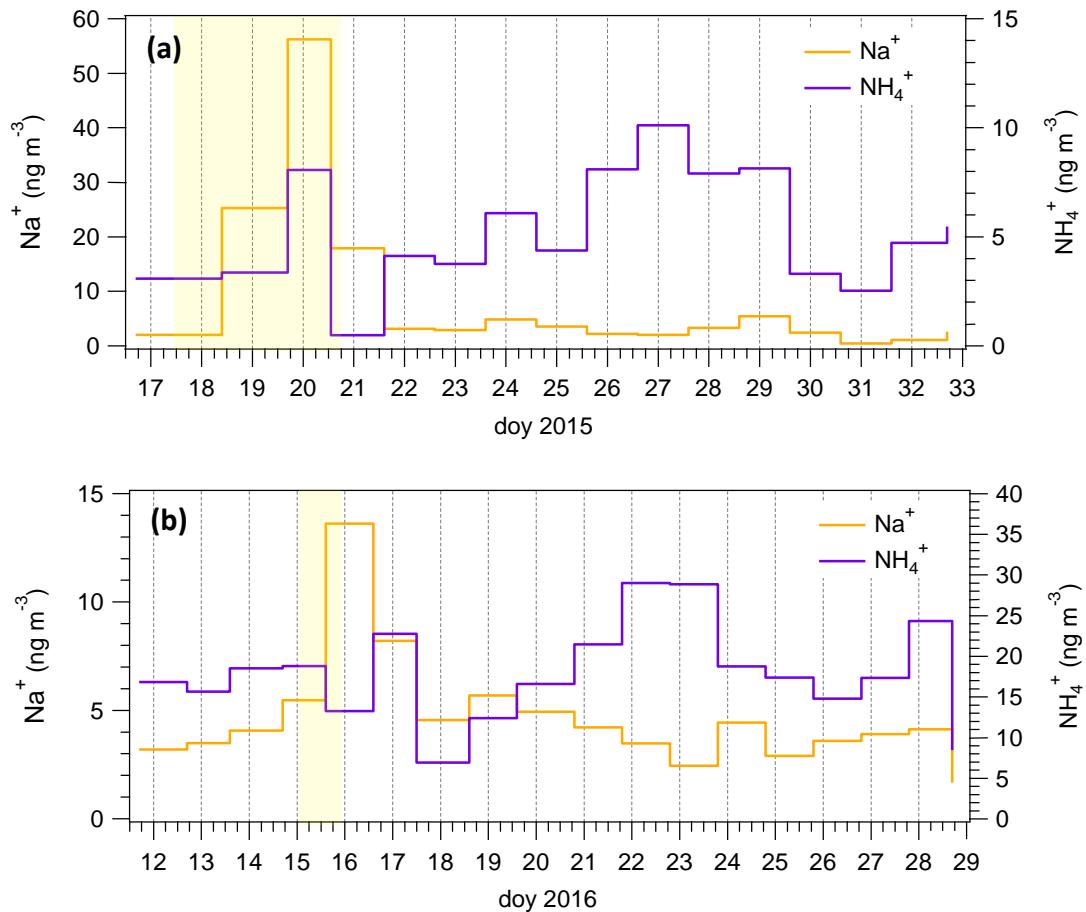
Figure S.4. Time series of the measured Na^+ and NH_4^+ concentrations from bulk aerosol (low volume) sampling during the campaign 2015 (a) and 2016 (b). The period of LPS15 and LPS16 are shaded in yellow.
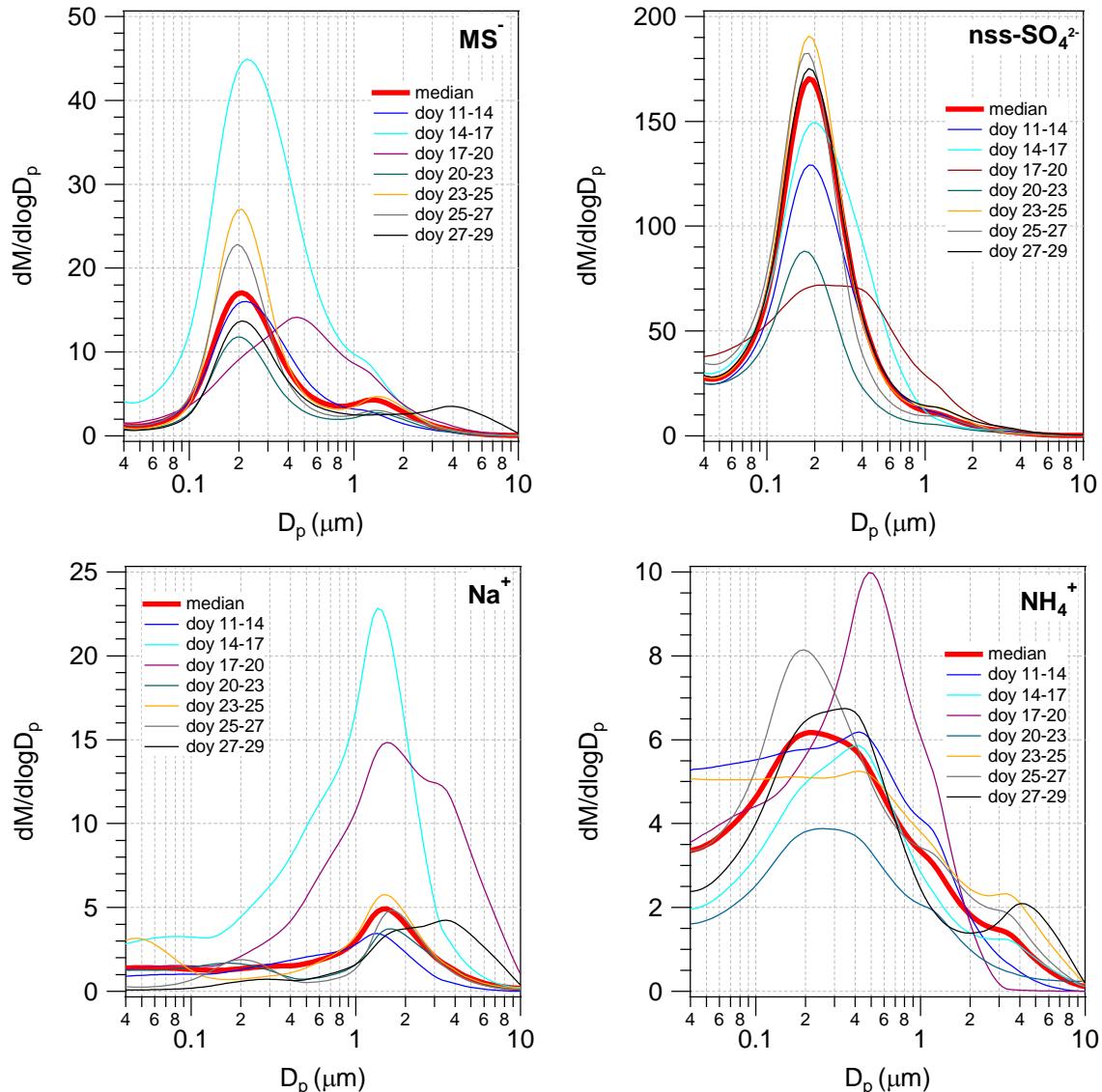
Figure S.5. Results from size segregated (Berner impactor) sampling during the campaign 2016 with the following mass portion of the respective ions in the super-µm range (>1µm): MS⁻ 14% (a), nss-SO$_4^{2-}$ 3% (b), Na⁺ 46% (c), and NH$_4^+$ 15% (d).
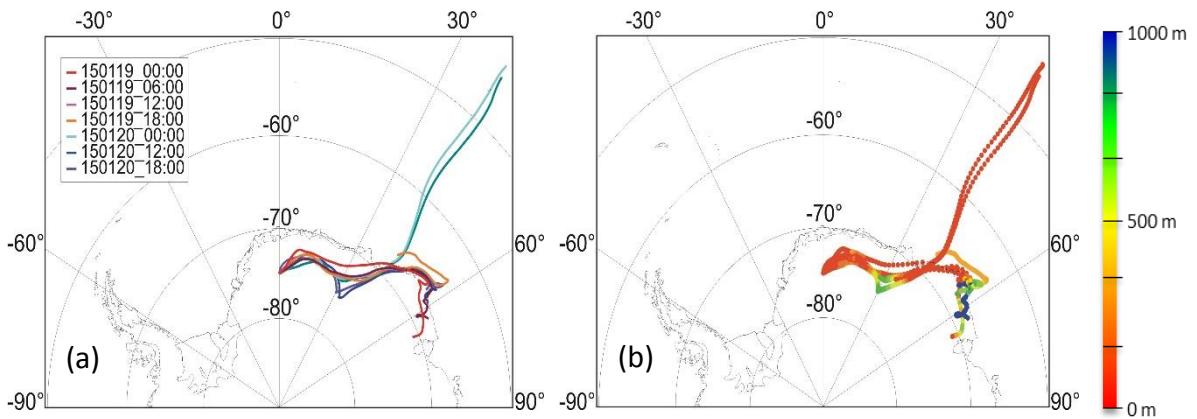
Figure S.6. Five day backward trajectories during the NPF event, similar to Fig. 13, but now with trajectory starting height of 10 m above Kohnen. On the right hand the travel height above ground (local topography) is illustrated in a color coded scale.
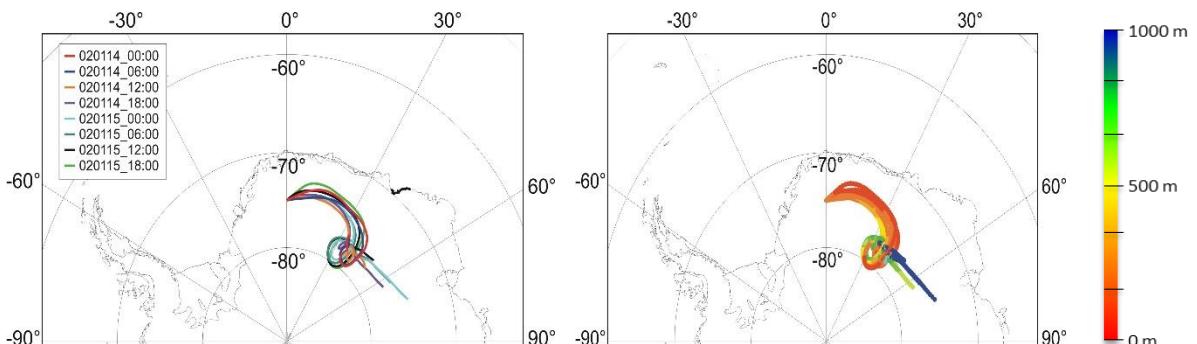
Figure S.7. Five day backward trajectories during outstanding biogenic sulfur concentrations observed during 14 and 15 January 2002 (Piel et al., 2006), based on NCEP meteorological data. On the right hand the travel height above ground (local topography) is illustrated in a color coded scale.
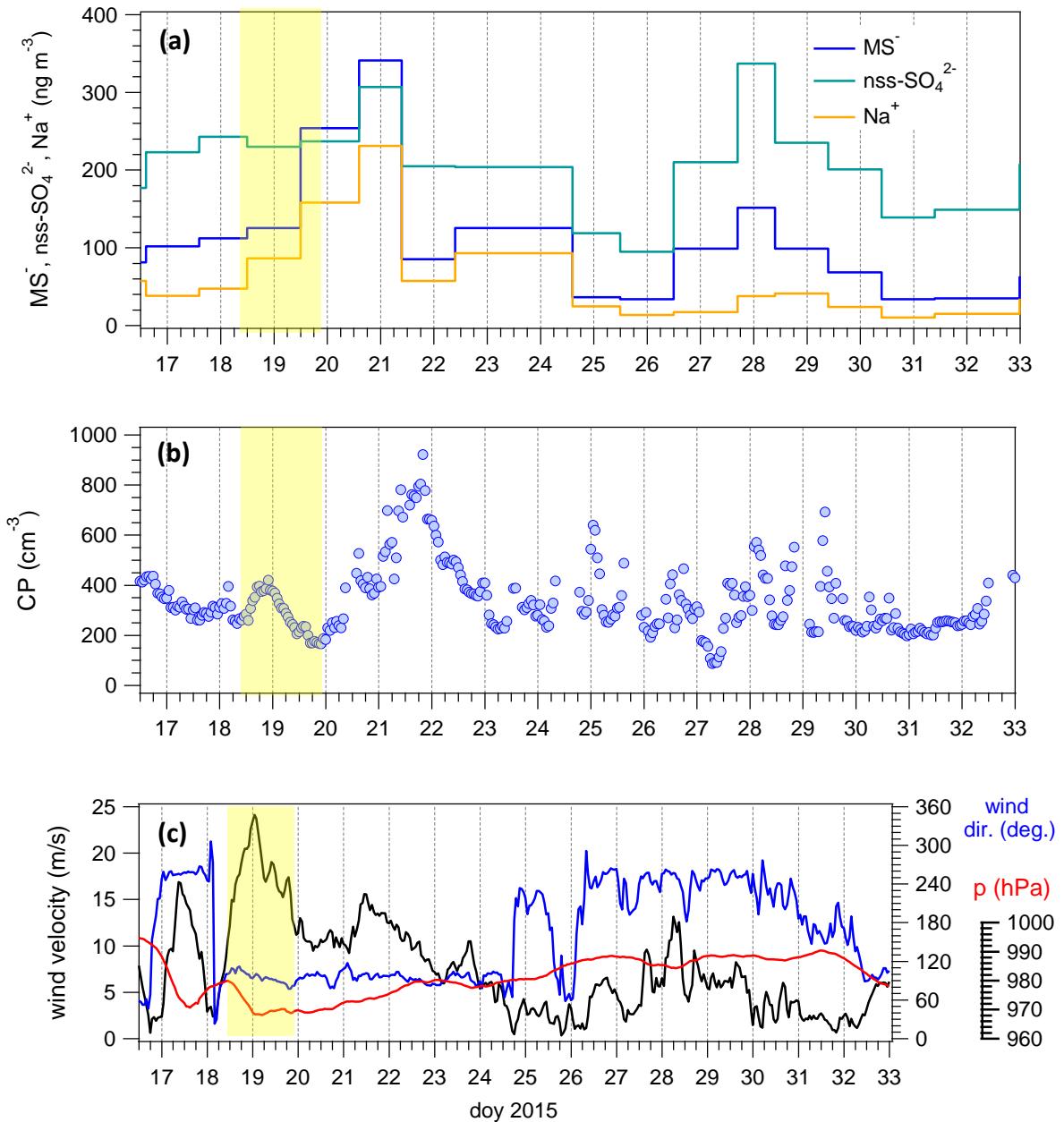
Figure S.8. Time series of the measured ionic composition of the aerosol (a), CP concentrations (b) and meteorological data (c) from coastal Neumayer station measured during the sampling period of the Kohnen campaign in 2015. The period of LPS15 is shaded in yellow.
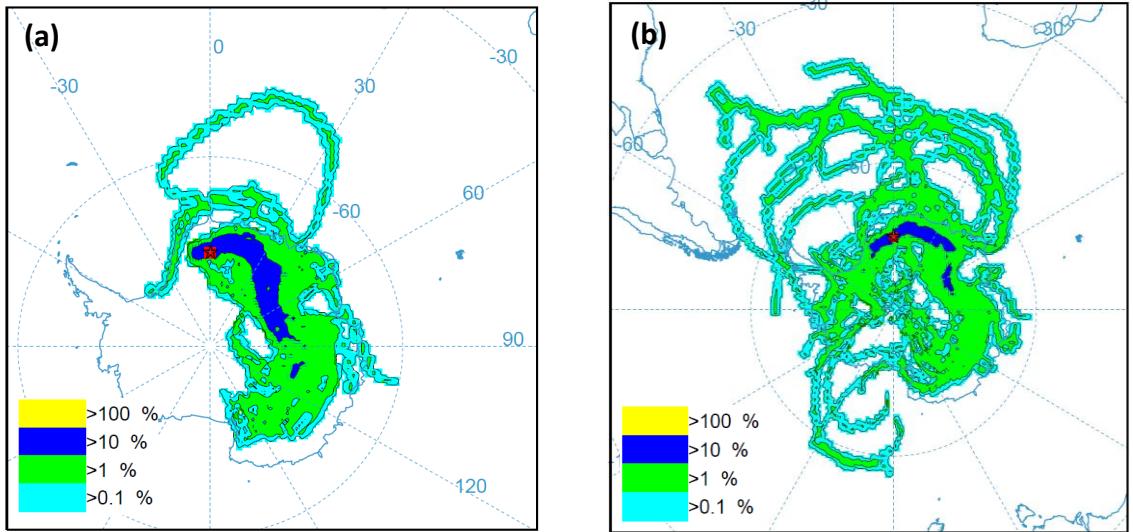
Figure S.9. Daily 10-day backward trajectories during clear sky condition in 2016 (doy 12 to doy 31, N = 80). Shown is the relative (percentage) number of trajectory intersection on a given grid cell (resolution 1°×1°). The left hand plot (a) presents all 10-day back trajectories for 3D approach, starting height 10 m, while on the right (b) the corresponding 10-days back trajectories for isentropic approach and starting height 10 m are shown.