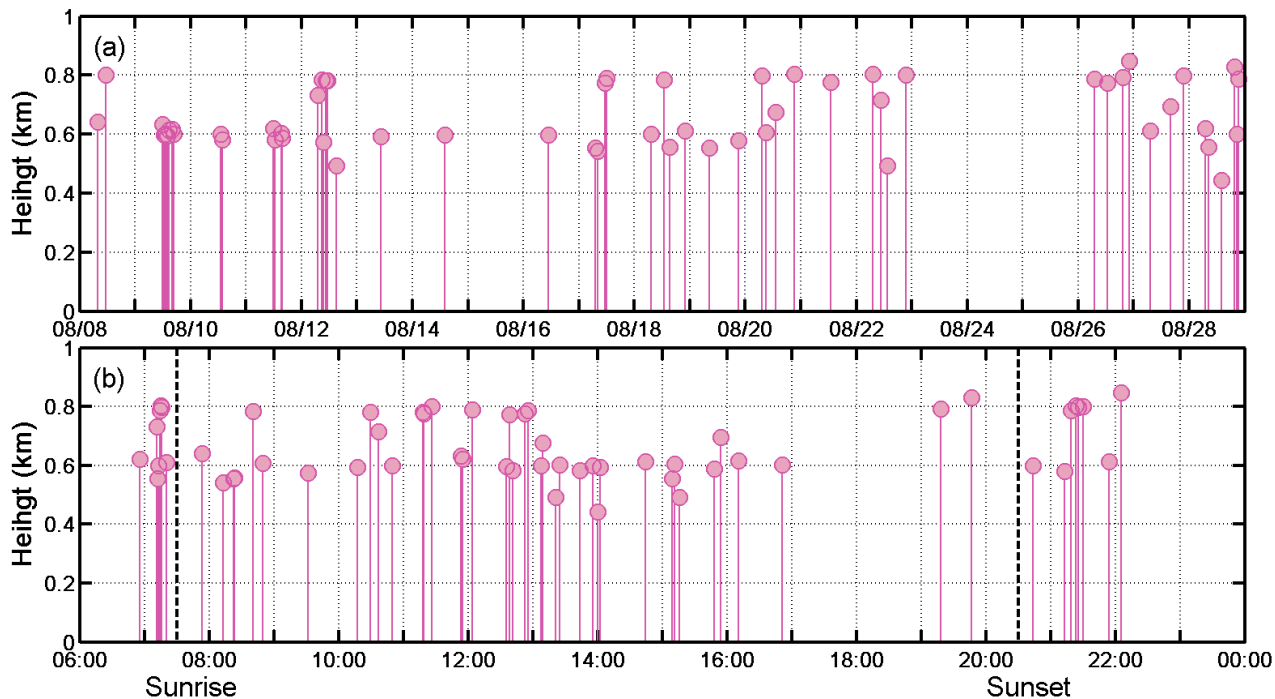*Supplement of*

Measurement report: Vertical profiling of particle size distributions over Lhasa, Tibet: Tethered balloon-based in-situ measurements and source apportionment

5   Liang Ran et al.

Correspondence to: Zhaoze Deng (dengzz@mail.iap.ac.cn) and Liang Ran (shirleyrl@mail.iap.ac.cn)

Figure S1 Launches of the tethered balloon and the maximum height reached by each launch (a) on different days during the campaign, (b) at different time of the day (in Beijing time), the average time for sunrise and sunset is indicated by dashed lines.
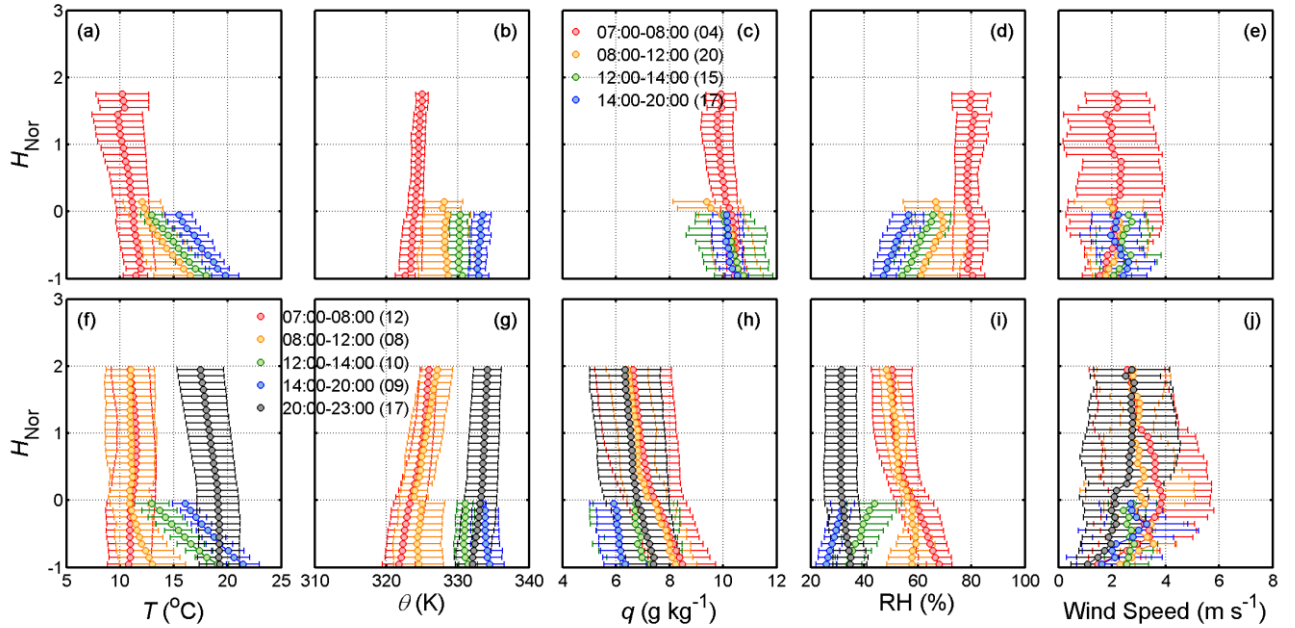
Figure S2 Average vertical profiles of (a) temperature (T), (b) potential temperature (θ), (c) specific humidity (q), (d) relative humidity (RH), and (e) wind speed measured during Period I, along the normalized height (H_{Nor}). Profiles for different time periods are shown in different colours, with dots representing average values and error bars representing standard deviations at each of the H_{Nor}. The number of data points used for averaging at each H_{Nor} was more than about 75% of the number of profiles during each time period, as given in parentheses. Average vertical profiles of meteorological parameters measured during Period II are displayed in the same way in (f)-(j).
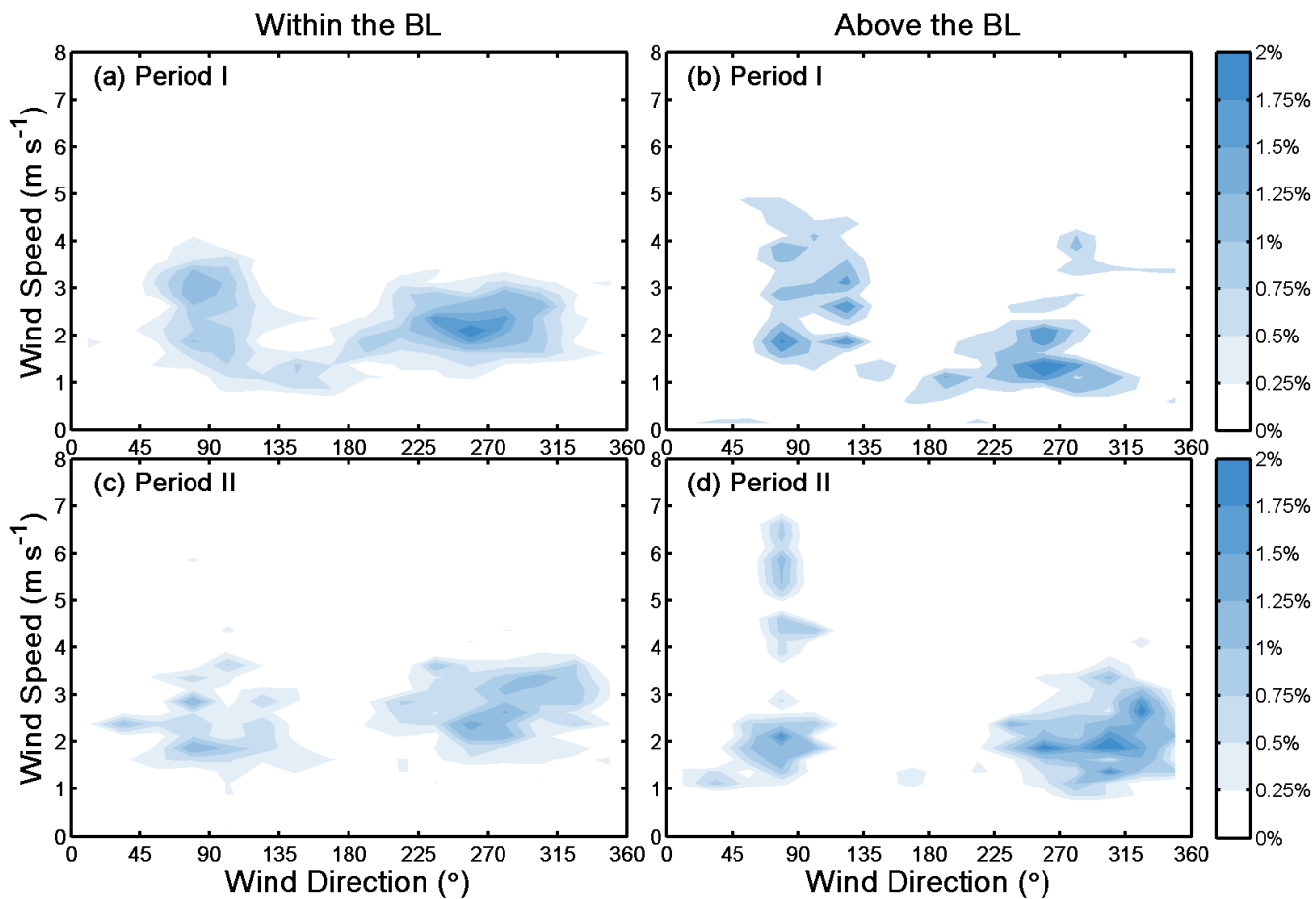
Figure S3 The probability distributions of wind speed (0.25 m s⁻¹ per bin) and wind direction (22.5 ° per bin) within the BL and above the BL, respectively during Period I (a-b) and Period II (c-d).
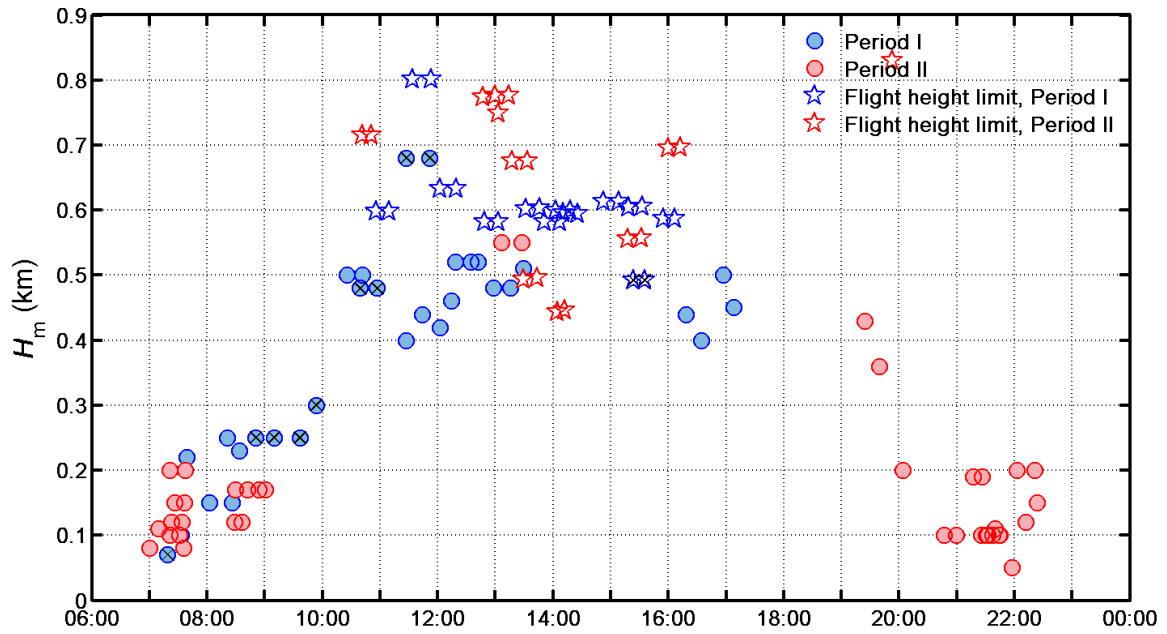
Figure S4 H_m **for each profile in Period I (in blue) and Period II (red). Dots indicate heights of the BL. The maximum height reached by the tethered balloon for a profile whose entire flight path is within the ML is marked by an asterisk. Besides, observations on 12 August are particularly pointed out by black cross.**
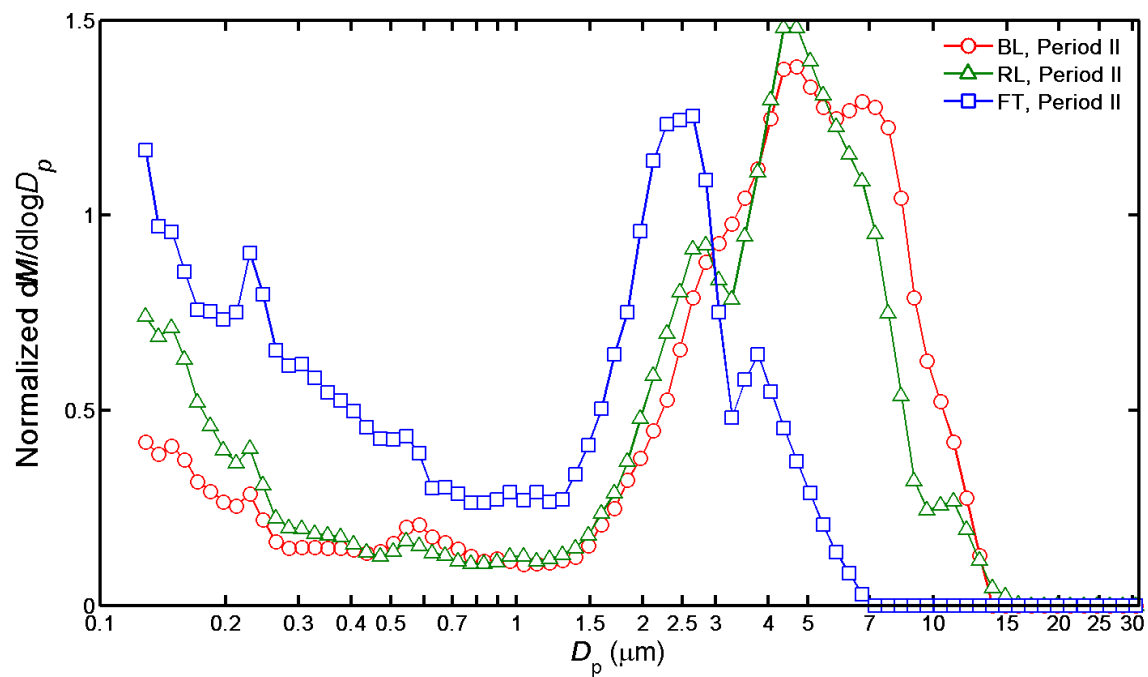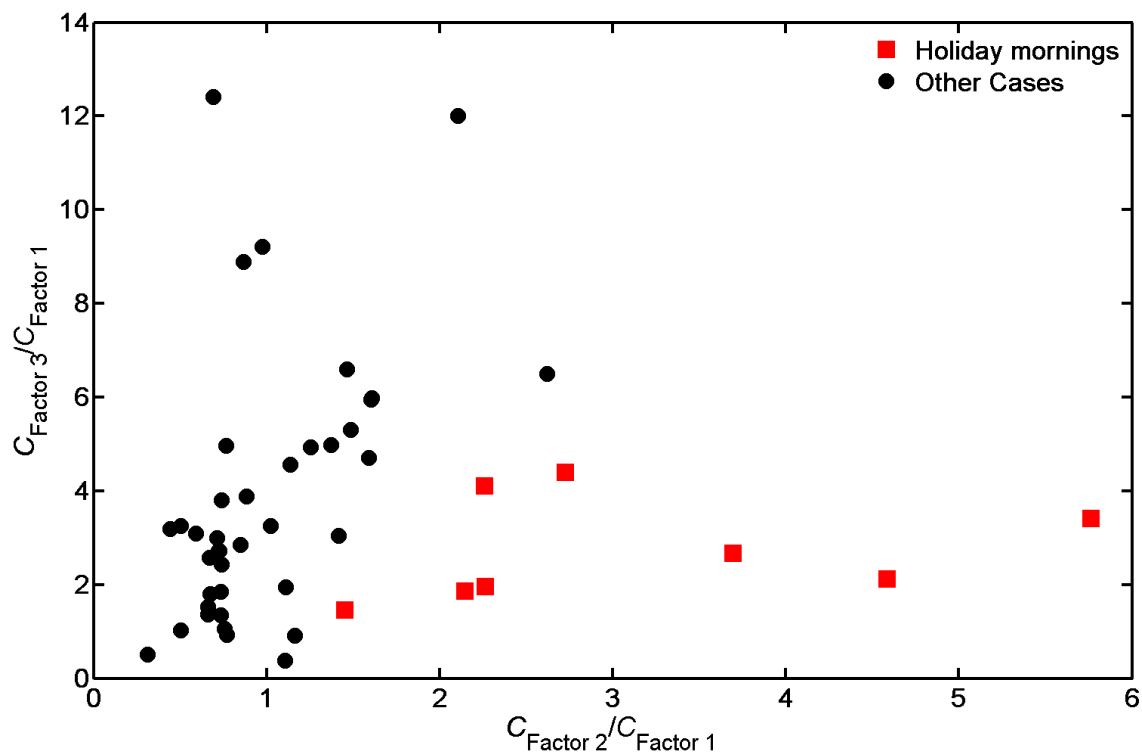
5

Figure S5 Normalized average particle mass size distributions obtained from the POPS and GRIMM 11-C.measurements for different layers in Period II as indicated by different markers.

Figure S6 The relationship between concentrations contributed by factor 3 ($C_{Factor\ 3}$) and by factor 2 ($C_{Factor\ 2}$) when both were normalized by concentrations contributed by factor 1 ($C_{Factor\ 1}$). Data collected on holiday mornings were marked by red squares and the others were marked by black dots.

5

Table S1 The number of profiles in each category is summarized for the five time periods during Period I and II. The number of profiles where the mixing layer height exceeded the flight limit is given in parentheses.

Time Periods	Period I			Period II		
	ML	NBL	Total	ML	NBL	Total
07:00-08:00	/	4	4	/	12	12
08:00-12:00	20(4)	/	20	8(2)	/	8
12:00-14:00	15(7)	/	15	10(8)	/	10
14:00-20:00	17(13)	/	17	9(6)	/	9
20:00-23:00	/	/	0	/	17	17
Campaign	52(24)	4	56	27(16)	29	56