

## Supplementary materials

### Planetary boundary layer and its relationship with PM<sub>2.5</sub> concentrations in Almaty, Kazakhstan

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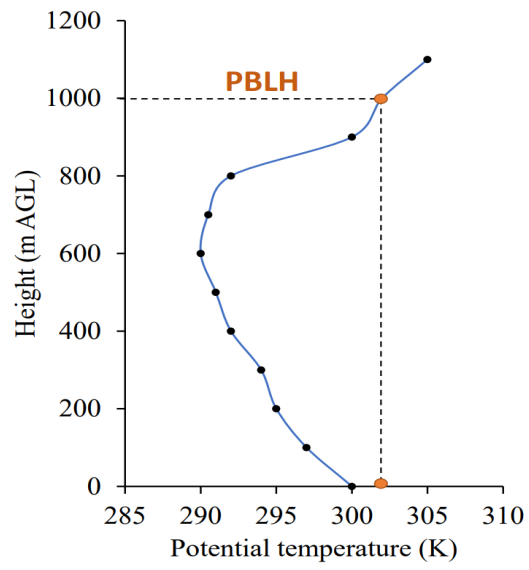
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**Table S1.** Descriptive statistics of PM<sub>2.5</sub> concentrations and meteorological data during March 1<sup>st</sup>, 2020 – February 28<sup>th</sup>, 2021

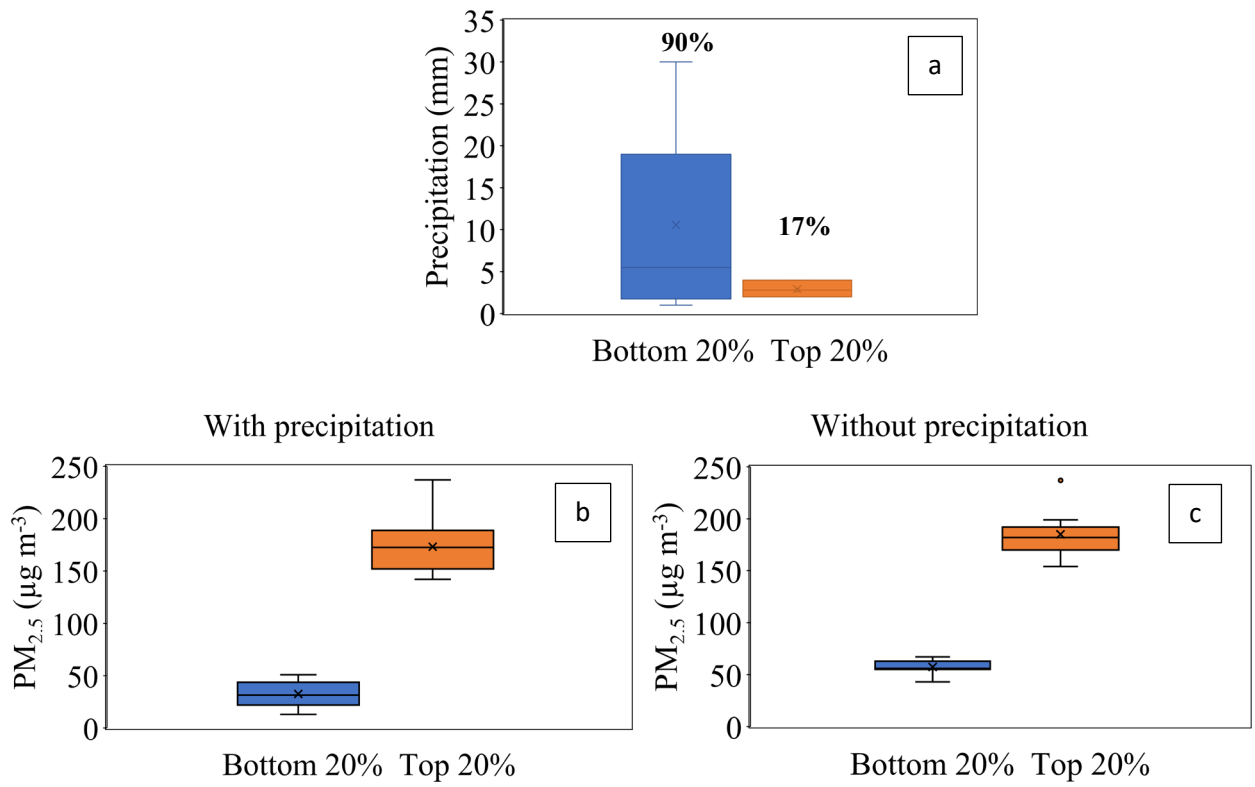
Statistical analysis	PM <sub>2.5</sub> ( $\mu\text{g m}^{-3}$ )	Temperature ( $^{\circ}\text{C}$ )	Relative humidity (%)	Wind speed ( $\text{m s}^{-1}$ )	Precipitation (mm)
N	7993	2915	2909	2918	284
Mean	39.2	9.5	60.6	2.3	3.7
Median	17.0	10.7	62.0	2.0	2.0
SD	50.7	12.8	24.0	1.5	6.2
Min	0.0	-20.6	11.0	0.0	0.2
0.25 <sup>th</sup> percentile	9.0	-0.7	40.0	1.0	0.6
0.50 <sup>th</sup> percentile	17.0	10.7	62.0	2.0	2.0
0.75 <sup>th</sup> percentile	47.0	19.8	82.0	3.0	4.0
Max	499.0	37.9	99.0	18.0	74.4

**Table S2.** Monthly average PM<sub>2.5</sub> concentrations at synoptic hours in March 2020 – February 2021.

Hour (Almaty time)	PM <sub>2.5</sub> concentration ( $\mu\text{g m}^{-3}$ ) Average											
	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
0	30.1	17.1	9.3	10.1	7.2	11.1	13.6	41.0	53.4	125.9	132.6	67.5
3	20.7	9.2	5.8	6.3	4.8	9.5	9.4	32.3	46.8	107.8	122.8	50.9
6	17.1	8.6	5.0	6.6	5.9	10.2	7.6	21.6	33.1	86.7	94.7	43.1
9	23.3	10.9	7.0	12.0	9.2	14.5	12.0	17.9	36.7	88.2	74.0	38.3
12	29.1	14.8	9.5	13.5	7.5	14.5	16.1	17.3	47.1	110.3	96.7	60.0
15	31.5	13.6	10.6	11.2	7.2	13.0	15.0	29.4	52.1	117.8	117.4	77.9
18	28.4	15.6	10.1	9.8	8.3	12.9	14.8	28.2	56.4	114.2	116.8	70.6
21	36.7	20.8	13.6	11.9	12.4	18.6	16.2	29.0	61.0	135.1	131.1	81.4



**Fig. S1.** PBLH determination by PT method



**Fig. S2.** Lowest (Bottom 20%) and highest (Top 20%) values of a) average daily precipitation b) concentrations of PM<sub>2.5</sub> with and c) concentrations of PM<sub>2.5</sub> without precipitation in winter of 2020-2021