Figure S1: BC core mass (top) and number (bottom) size distribution measured by the SP2. Lognormal fits are overlaid in plain colored line with the 3 modes detailed in dashed colored lines.
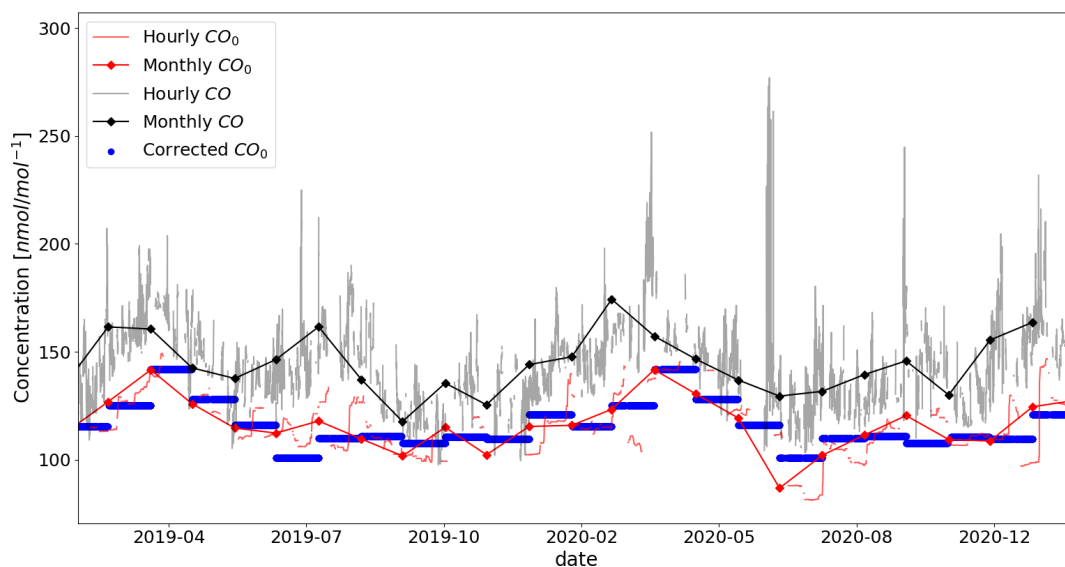
Figure S2: Determination of ΔBC/ΔCO emission ratios. Hourly background CO (red line) was calculated as the 14-day rolling 5th percentile of CO hourly concentrations (in gray). Then these values were averaged by months (red and blue dots)
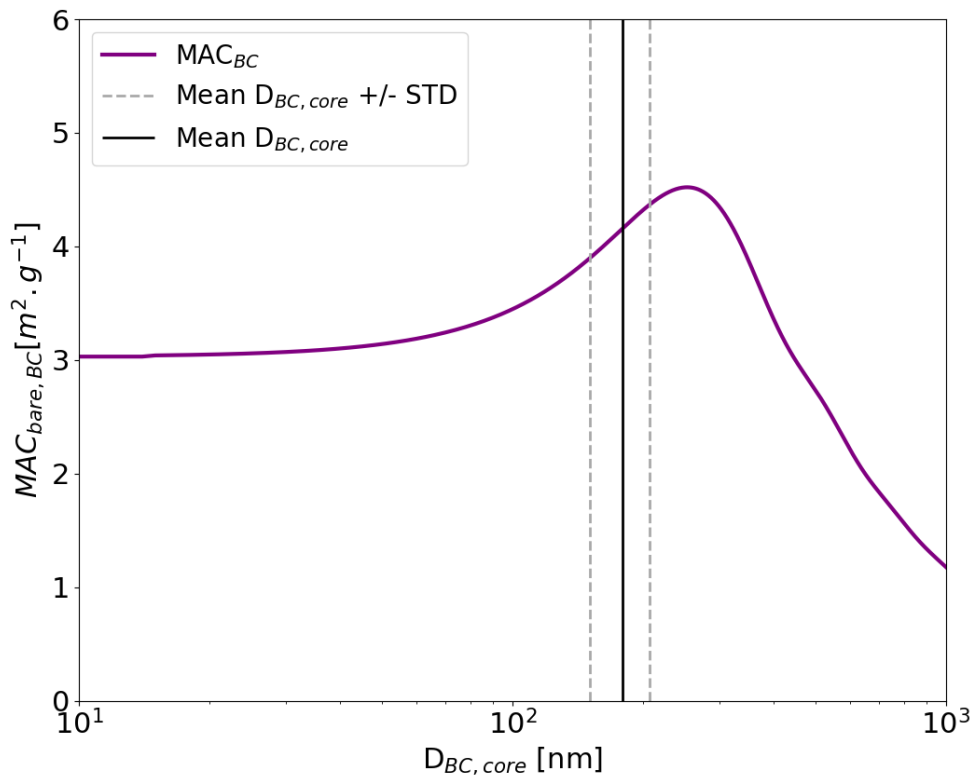
Figure S3: Bare BC MAC calculation with Mie theory as a function of the BC core diameter. Vertical solid and dashed lines are the mean $D_{BC,core}$ and standard deviation, respectively.
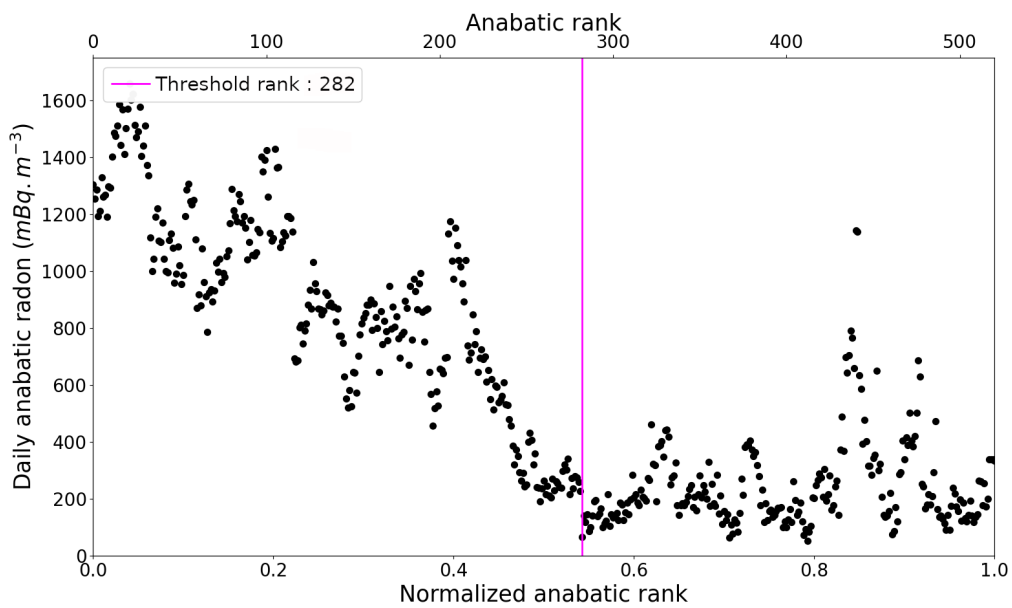
Figure S4: Daily anabatic radon as function of the day anabatic rank (see text for details). Each dot represent an observation day ranked from the most anabatically-influenced day (left) to the least one (right). The vertical pink line represents the cut-off rank before which days can be considered as PBL-influenced.

Table S1 : Statistics of BL/FT cases determination at PDM

	All the campaign	Winter	Summer
FT conditions (h)	1149	294	293
BL influence (h)	894	105	318
%age of FT influence	56.2	73.2	47.9
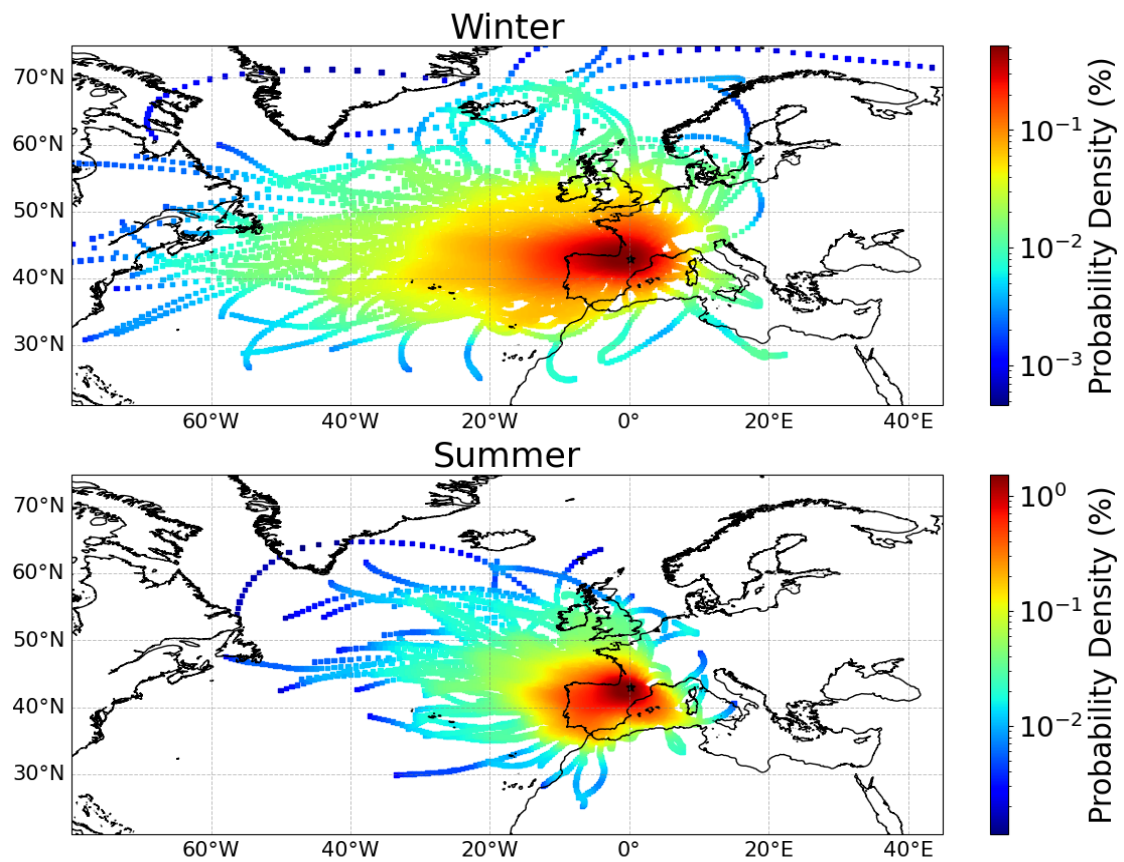
Figure S5: Computed density of airmass backtrajectories reaching PDM during the campaign calculated with the HYSPLIT model for winter and summer.
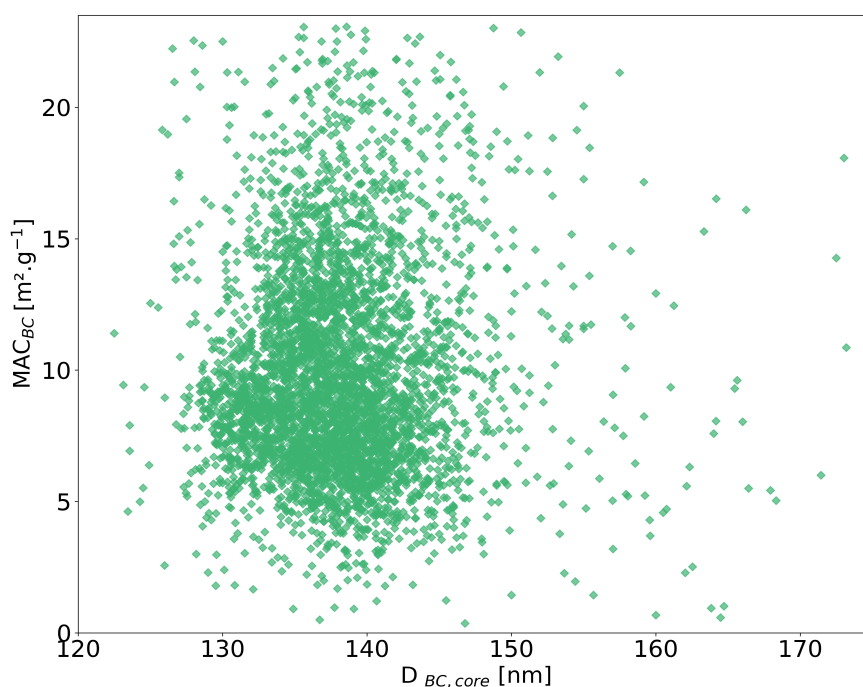
Figure S6: MAC$_{BC}$ as a function of D$_{BC,core}$ over the campaign. Each point represents 1h average data.
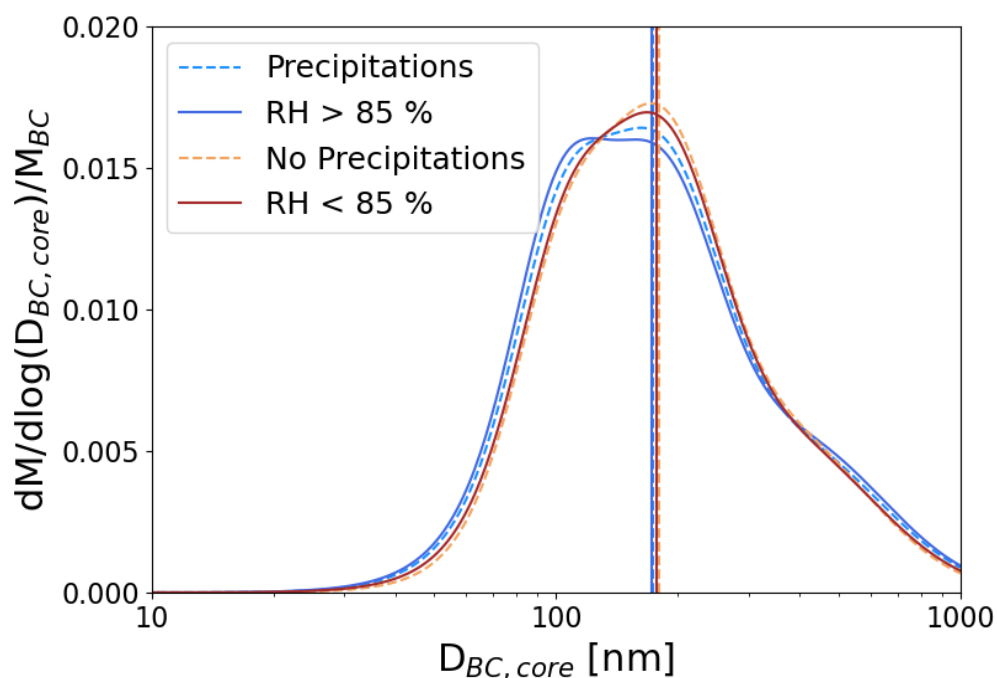
Figure S7 :Mass size distributions of BC core measured by the SP2 as a function of the presence or not of precipitations along the path of airmasses arriving at PDM , and whether the relative humidity was over 85 % or not.
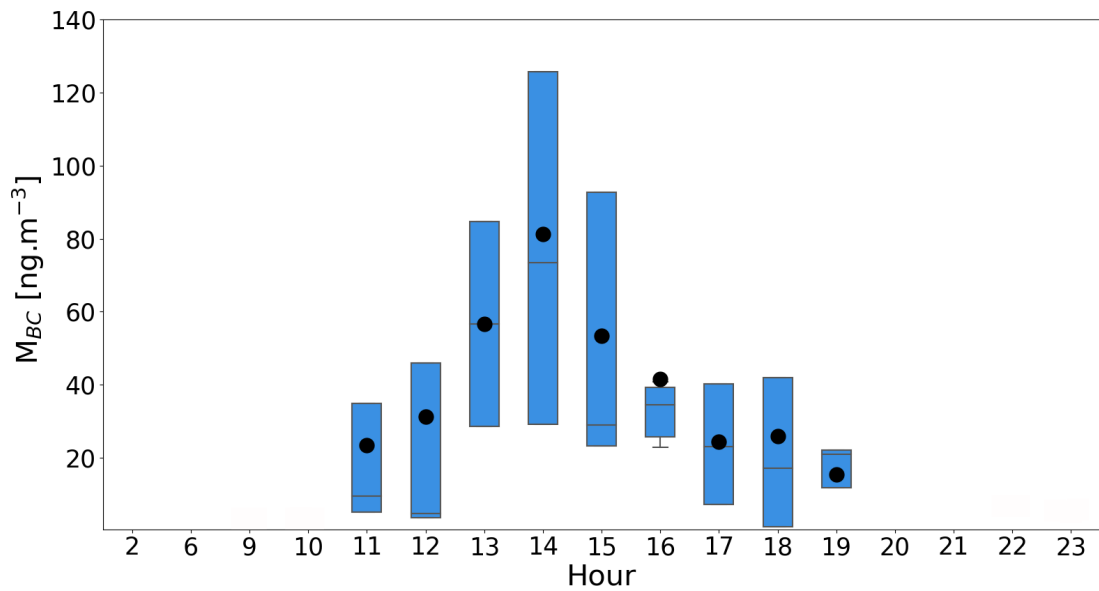
Figure S8: Hourly variation of BC mass concentration in winter under PBL-influenced conditions. Statistics of the boxplot are the same as Fig. 7. Times without boxplot are due to the selected PBL-influenced hours, which are mostly during the daytime.
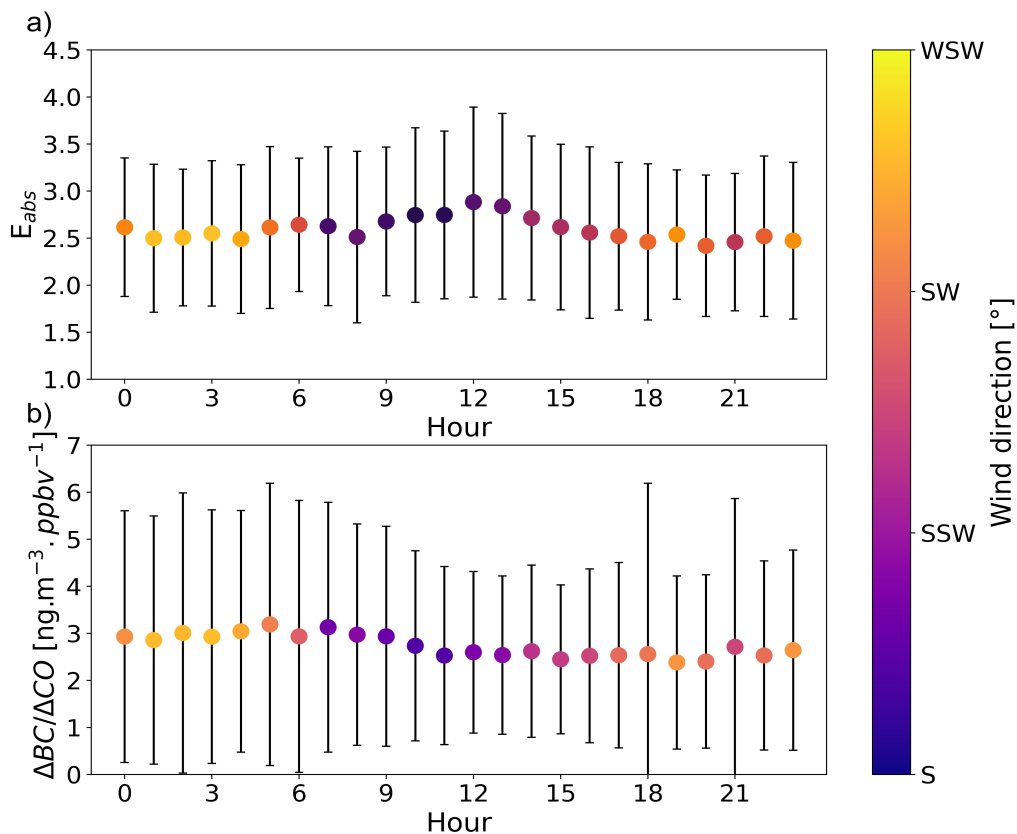
Figure S9: Hourly variation of E_{abs} and $\Delta BC/\Delta CO$ values in summer. Dots represent mean values and whiskers are one standard deviation. Dots are colored as a function of the wind direction.
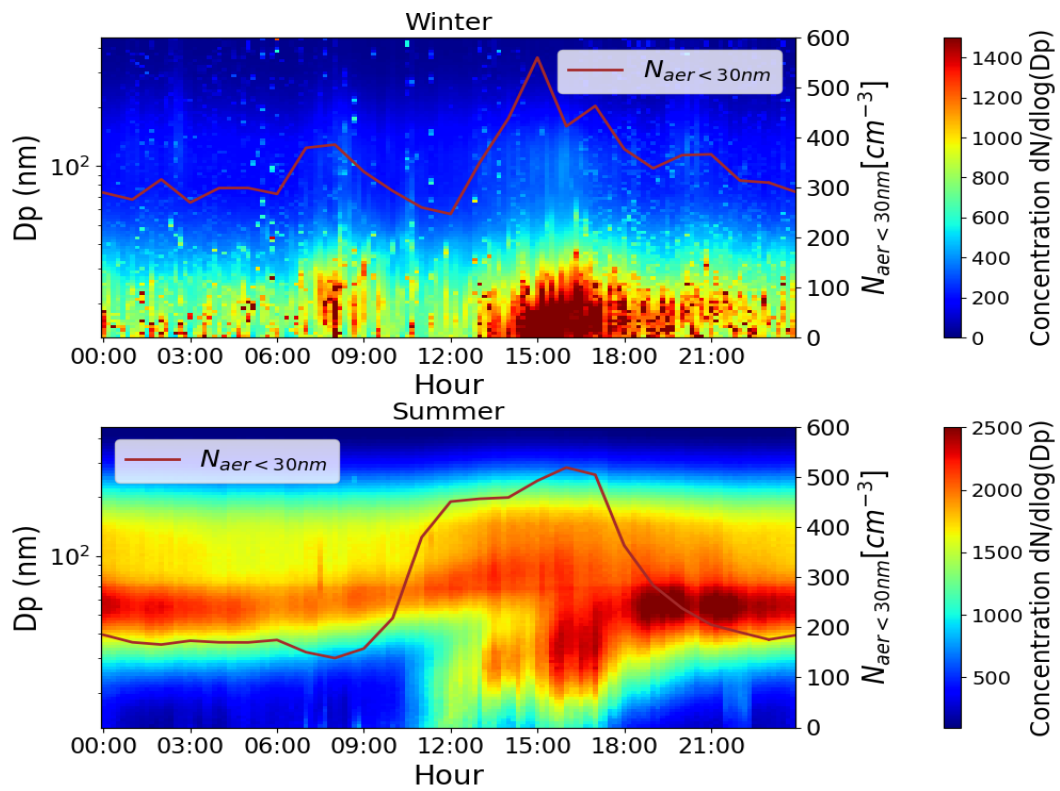
Figure S10: Average diurnal cycle of aerosols number size distribution in (a) winter and (b) summer. Number concentrations of the nucleation mode (<30nm) are overlaid in red.