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Introducing the novel concept of cumulative concentration roses for studying the transport of ultrafine particles from an airport to adjacent residential areas

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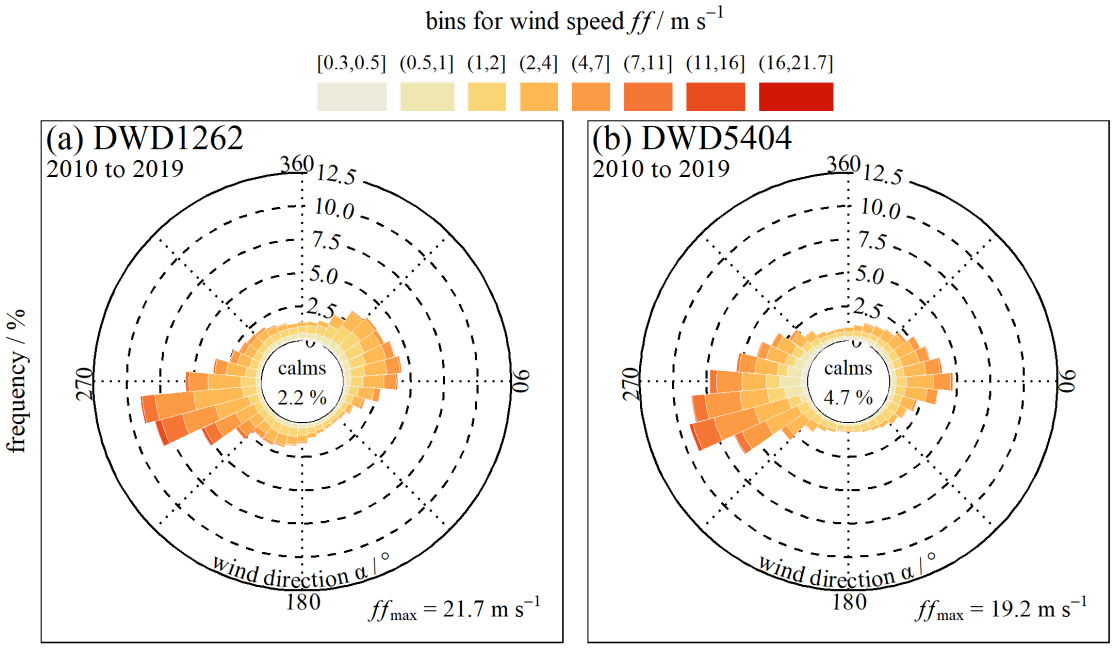

Figure SI1: Wind roses based on wind data from DWD1262 at Munich Airport (a) and DWD5404 at Weihenstephan-Dürnast. Time period covered are full years from 2010 to 2019. Bottom right corner gives the maximum wind speed ff_{max} observed for each data set.

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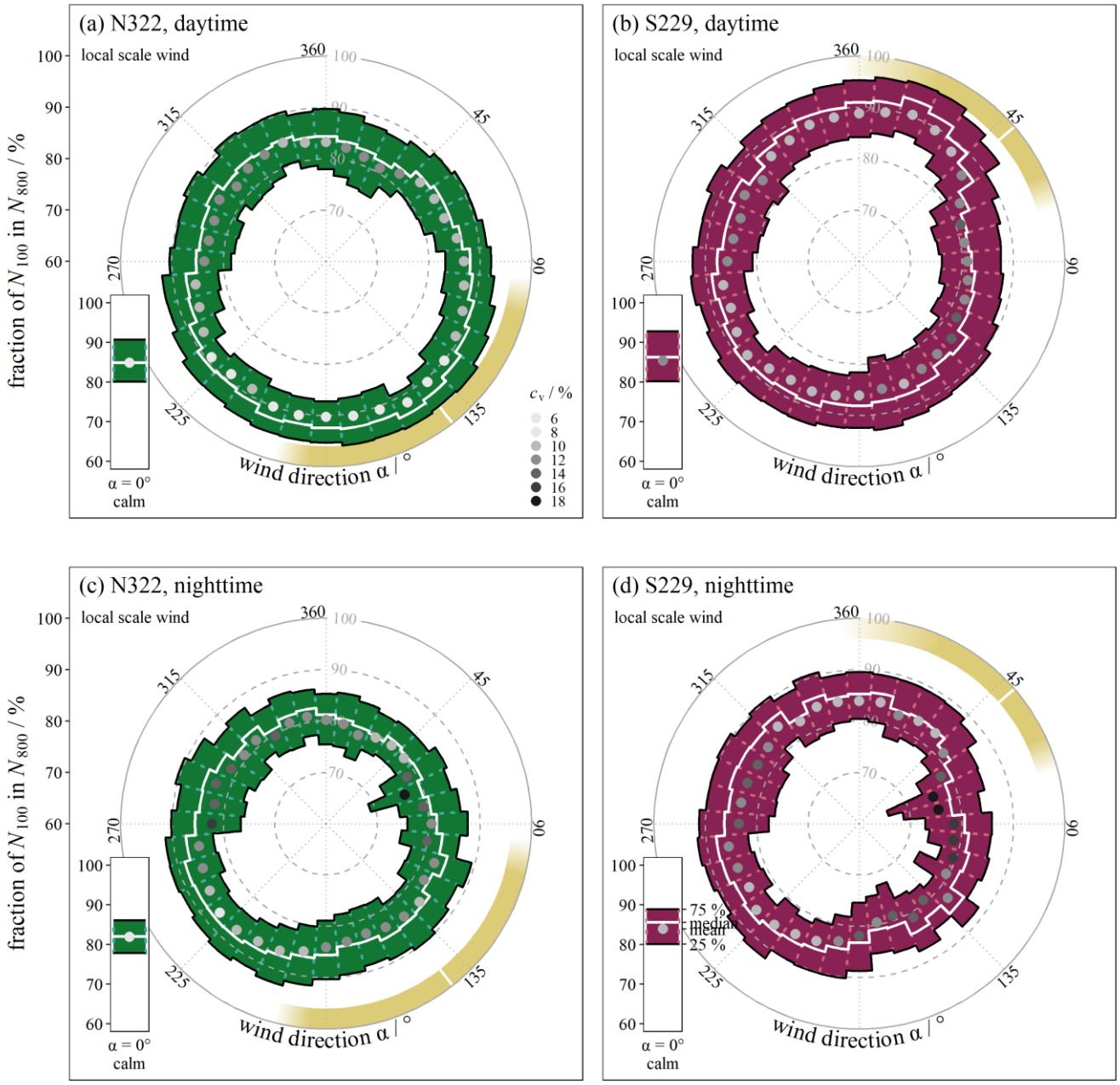

Figure SI2: Representation of the fraction of particle number concentrations N_{100} in N_{800} as squeeze box plots for sites N322 (a and c) and S229 (b and d) for the time period covered in this study. Other than in Fig. 6 – 9 no 0 % percentile is shown. Top and bottom panel distinguish between daytime and nighttime as defined in Sect. 2.1. The yellowish arc is the airport sector indicator, see Fig. 1.

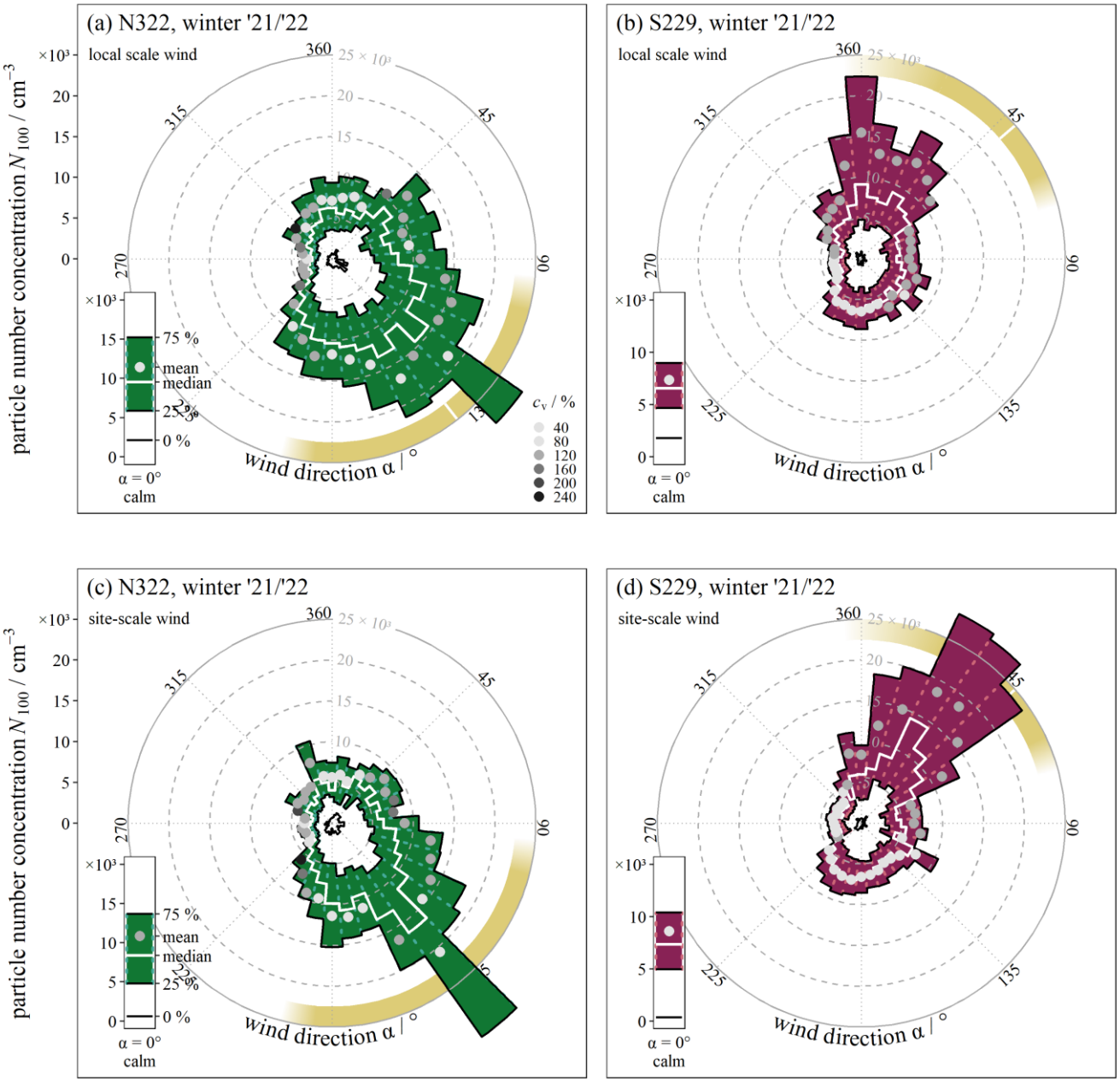

Figure SI3: Concentration roses as squeeze box plots for particle number concentrations N_{100} for sites N322 (a and c) and S229 (b and d) for the time period of winter 2021/2022. Top and bottom panel distinguish between local scale and site-scale wind. The yellowish arc is the airport sector indicator, see Fig. 1.

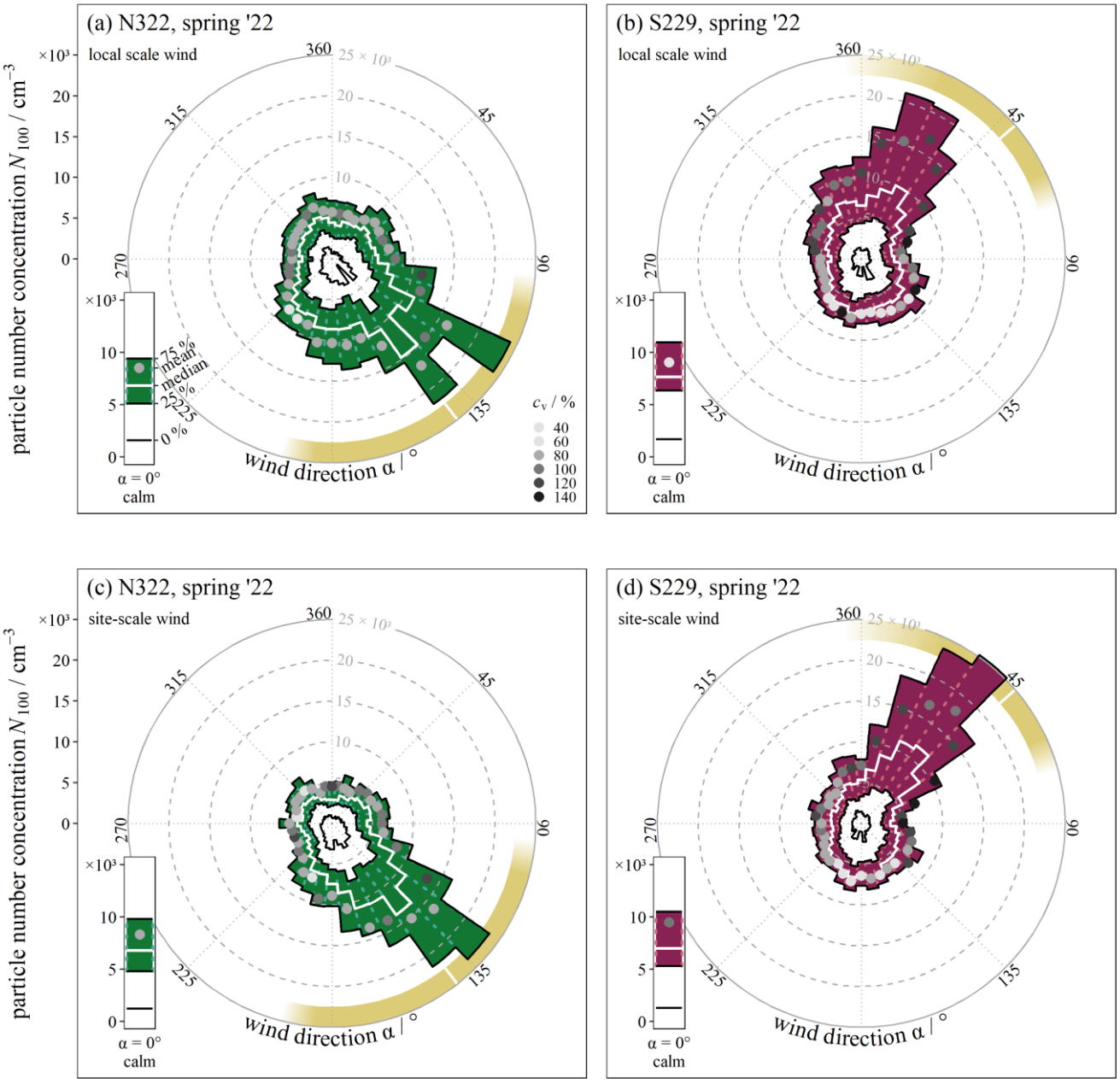

Figure SI4: Concentration roses as squeeze box plots for particle number concentrations N_{100} for sites N322 (a and c) and S229 (b and d) for the time period of spring 2022. Top and bottom panel distinguish between local scale and site-scale wind. The yellowish arc is the airport sector indicator, see Fig. 1.

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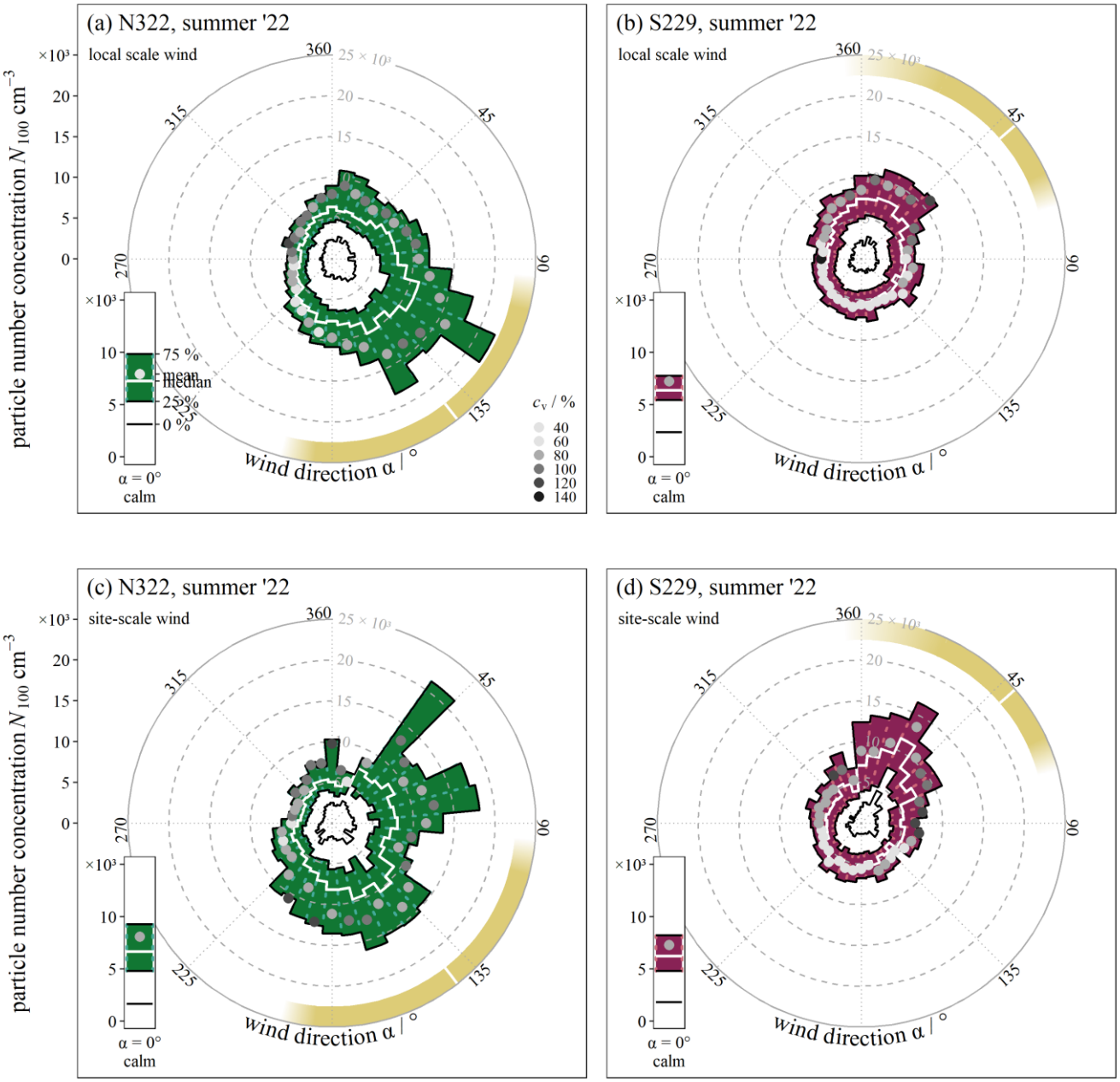

Figure SI5: Concentration roses as squeeze box plots for particle number concentrations N_{100} for sites N322 (a and c) and S229 (b and d) for the time period of summer 2022. Top and bottom panel distinguish between local scale and site-scale wind. The yellowish arc is the airport sector indicator, see Fig. 1.

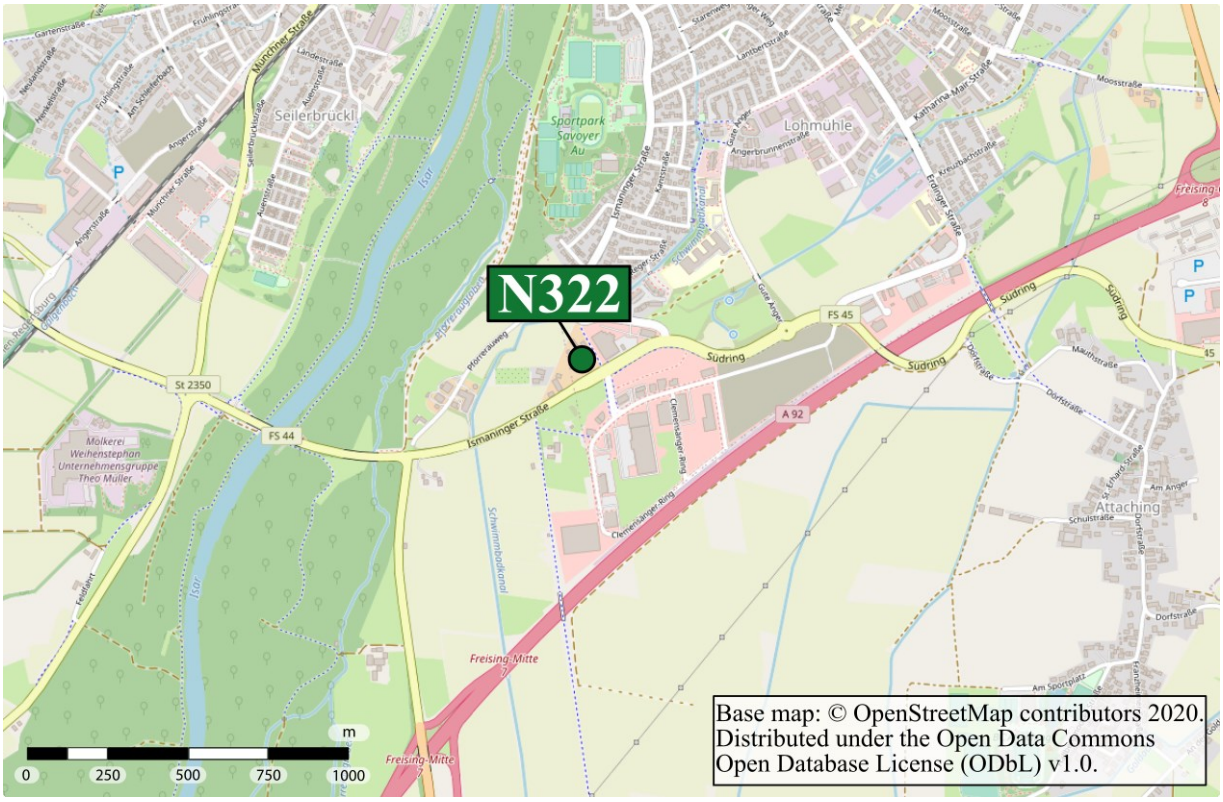

Fig. SI6a: Map section of the immediate surroundings of site N322. Intended to be used together with the information given in Sect 2.2.

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Fig. SI6b: Map section of the immediate surroundings of site S229. Intended to be used together with the information given in Sect 2.2.

Fig. SI6c: Digital ortophotograph (DOP) of the immediate surroundings of site N322. DOP with 0.4 m resolution. Intended to be used together with the information given in Sect 2.2. CC BY 4.0, Bayerische Vermessungsverwaltung – www.geodaten.bayern.de. Labels and scale added by the authors.

Fig. SI6d: Digital ortophotograph (DOP) of the immediate surroundings of site S229. DOP with 0.4 m resolution. Intended to be used together with the information given in Sect 2.2. CC BY 4.0, Bayerische Vermessungsverwaltung – www.geodaten.bayern.de. Labels and scale added by the authors.

Table SI1: Factor of increase in median particle number concentrations for size fractions N_{100} and N_{800} between the sector *excluding* and the sector *including* Munich Airport. Calms are not included. See. Fig. 1 for the sector definitions for each site. The table distinguishes the factors between two type of wind sources (local scale and site-scale wind, see. Fig. 2 and Sect. 2.4), and the time of day (see Table 1 and Sect. 2.1). The time period covered is the whole observation period of this study.

size fraction	*site*	*time of day*	*factor of increase*	
			local wind	*site-scale wind*
N_{100}	N322	daytime	2.2	2.0
		nighttime	1.4	1.5
		whole day	1.8	2.0
	S229	daytime	1.6	1.8
		nighttime	1.2	1.3
		whole day	1.5	1.7
N_{800}	N322	daytime	2.0	1.9
		nighttime	1.3	1.4
		whole day	1.7	1.8
	S229	daytime	1.6	1.8
		nighttime	1.3	1.4
		whole day	1.5	1.7