

“Field comparison of dry deposition samplers for collection of atmospheric mineral dust: results from single-particle characterization”

A. WAZA^{1,*}, K. SCHNEIDERS¹, J. MAY², S. RODRÍGUEZ^{3,4}, B. EPPLER², K. KANDLER¹

¹Atmospheric Aerosol, Institute for Applied Geosciences, Technische Universität Darmstadt, D-64287 Darmstadt, Germany

²Institute for Energy Systems & Technology, Technische Universität Darmstadt, D-64287 Darmstadt, Germany

³Izaña Atmospheric Research Centre, AEMET, Tenerife, Spain.

⁴Estación Experimental de Zonas Áridas, EEZA CSIC, Almería, Spain.

*correspondence to andebo.waza@geo.tu-darmstadt.de

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Table S 1: Minimum, maximum and median daily basis mass deposition rate (**mg/(m²d)**) measured by **Vertical deposition samplers**. Mass deposition rate in each size interval is also shown.

FP=Flat plate, Sig=Sigma-2

Samp. Id.	Date	Temp (°C)	Wind speed (m/s)	Mass deposition rate (mg/(m ² d))					
				Size interval (aerodynamic diameter)					
				1-2 µm	2-4 µm	4-8 µm	8-16 µm	16-32 µm	32-64 µm
FP	02.08.17	15.997	2.055	0.0125	0.0332	0.1591	0.6915	1.0487	0
FP	03.08.17	16.832	2.182	0.0178	0.085	0.4457	3.1786	3.5723	12.2381
FP	09.08.17	22.064	3.045	0.2318	2.5612	12.1382	22.3694	17.5472	0
FP	10.08.17	22.041	2.694	0.1268	1.7105	7.6181	14.3374	10.8418	7.2271
FP	20.08.17	23.049	2.321	0.0587	0.9965	7.7644	31.8469	39.2924	0
FP	21.08.17	22.127	1.991	0.0625	1.2487	9.9323	29.9751	22.0631	0
FP	22.08.17	21.126	3.011	0.0413	1.0977	8.4911	16.1487	9.563	0
FP	16.07.17	21.407	1.687	0.1512	1.6673	5.8333	10.3739	6.789	0
FP	18.07.17	19.863	3.289	0.0773	1.0835	4.3797	5.3431	4.4326	0
FP	19.07.17	17.691	4.275	0.0191	0.2874	1.4257	2.5807	0.7248	0
FP	20.07.17	15.915	4.620	0.0084	0.0437	0.3936	1.7336	2.0418	0
FP	24.07.17	20.758	3.883	0.1656	2.1236	8.9983	13.6345	2.7224	0
FP	25.07.17	20.784	2.055	0.1468	1.5641	6.7421	11.8483	0.7455	0
FP	26.07.17	20.989	2.550	0.0819	1.0551	5.0441	7.0303	1.8159	0
FP	27.07.17	21.563	2.092	0.1272	1.3325	6.6209	5.5919	0.8894	0

FP	28.07.17	22.325	2.318	0.0912	1.2328	4.7233	4.0095	1.9389	0
FP	29.07.17	21.971	4.438	0.0145	0.0798	0.5085	0.7329	1.9062	0
FP	30.07.17	19.823	4.874	0.08	0.2918	1.2003	1.9713	0	0
Sig	02.08.17	15.997	2.055	0.0133	0.0435	0.3232	1.4541	1.1561	0
Sig	03.08.17	16.832	2.182	0.0117	0.0637	0.2629	0.7752	0.7638	0
Sig	04.08.17	18.734	3.251	0.0537	0.2111	0.6742	0.9907	0.2664	0
Sig	09.08.17	22.064	3.045	0.2747	3.2314	12.3996	21.4241	7.4674	0
Sig	10.08.17	22.041	2.694	0.1171	1.312	4.7166	7.9581	1.4412	0
Sig	11.08.17	20.230	4.490	0.0506	0.3731	1.4438	3.2957	3.822	5.9832
Sig	12.08.17	18.666	4.551	0.0435	0.3212	1.0996	2.4052	2.1606	0
Sig	14.08.17	19.269	5.154	0.0929	0.6751	2.6105	5.3232	6.6811	0
Sig	15.08.17	19.918	1.855	0.0113	0.0581	0.2661	0.384	1.164	0
Sig	16.08.17	22.284	1.523	0.1003	0.973	3.507	5.4434	4.8978	0
Sig	17.08.17	21.384	2.978	0.1022	0.6704	2.382	4.9459	4.6931	0
Sig	18.08.17	20.574	3.080	0.0423	0.2089	0.7355	1.606	1.455	0
Sig	19.08.17	22.836	2.388	0.0337	0.2013	0.9165	2.0097	2.0509	0
Sig	20.08.17	23.049	2.321	0.2254	2.5137	12.8442	44.6417	42.0205	11.7559
Sig	21.08.17	22.127	1.991	0.3337	4.1199	20.8917	48.5994	36.6512	6.6514
Sig	22.08.17	21.126	3.011	0.2849	3.5102	16.3368	35.5797	17.1256	0
Sig	20.07.17	15.915	4.620	0.0102	0.0431	0.2539	1.8245	2.4863	0
Sig	21.07.17	14.153	3.830	0.0093	0.0405	0.1077	0.5439	0	0
Sig	26.07.17	20.989	2.550	0.1704	2.0074	8.3447	11.0216	3.496	0
Sig	27.07.17	21.563	2.092	0.1692	2.3802	10.0826	9.6501	4.2398	0
Sig	28.07.17	22.325	2.318	0.2126	2.3481	9.5403	10.2896	1.9448	0
Sig	29.07.17	21.971	4.438	0.1927	2.1052	8.1321	8.5173	1.0481	0
Sig	30.07.17	19.823	4.874	0.4671	1.2559	2.7535	4.3127	6.5318	0

Table S 2: Minimum, maximum and median daily basis number deposition rate ($1/(m^2d)$) measured by **Vertical deposition samplers**. Number deposition rate in each size interval is also shown.

FP=Flat plate, Sig=Sigma-2

Samp . Id.	Date	Temp (°C)	Wind speed (m/s)	Number deposition rate $1/(m^2d)$					
				Size interval (aerodynamic diameter)					
				1-2 μm	2-4 μm	4-8 μm	8-16 μm	16-32 μm	32-64 μm
FP	02.08.17	15.997	2.055	2.64E+06	9.95E+05	6.99E+05	2.69E+05	2.70E+05	0
FP	03.08.17	16.832	2.182	4.22E+06	2.39E+06	1.43E+06	1.14E+06	1.99E+05	8.50E+04
FP	09.08.17	22.064	3.045	4.12E+07	6.57E+07	4.39E+07	1.10E+07	8.10E+05	0
FP	10.08.17	22.041	2.694	2.17E+07	4.28E+07	2.70E+07	6.87E+06	6.30E+05	4.00E+04
FP	20.08.17	23.049	2.321	9.70E+06	2.33E+07	2.49E+07	1.20E+07	2.79E+06	0
FP	21.08.17	22.127	1.991	9.52E+06	2.87E+07	3.42E+07	1.35E+07	1.66E+06	0
FP	22.08.17	21.126	3.011	6.48E+06	2.43E+07	2.87E+07	7.87E+06	5.40E+05	0

FP	16.07.17	21.407	1.687	2.72E+07	4.26E+07	2.25E+07	5.69E+06	4.40E+05	0
FP	18.07.17	19.863	3.289	1.33E+07	2.74E+07	1.66E+07	3.02E+06	3.20E+05	0
FP	19.07.17	17.691	4.275	3.34E+06	6.59E+06	4.97E+06	1.32E+06	8.40E+04	0
FP	20.07.17	15.915	4.620	1.80E+06	1.34E+06	1.27E+06	6.96E+05	7.20E+04	0
FP	24.07.17	20.758	3.883	2.83E+07	5.16E+07	3.29E+07	7.71E+06	2.30E+05	0
FP	25.07.17	20.784	2.055	2.58E+07	4.07E+07	2.47E+07	6.18E+06	5.00E+04	0
FP	26.07.17	20.989	2.550	4.22E+06	1.59E+07	1.87E+07	5.13E+06	3.50E+05	0
FP	27.07.17	21.563	2.092	2.46E+07	3.40E+07	2.47E+07	3.59E+06	1.20E+05	0
FP	28.07.17	22.325	2.318	1.59E+07	3.19E+07	1.75E+07	2.43E+06	8.00E+04	0
FP	29.07.17	21.971	4.438	2.80E+06	2.08E+07	1.48E+06	4.25E+05	1.50E+05	0
FP	30.07.17	19.823	4.874	1.98E+07	7.50E+06	4.85E+06	9.70E+05	0	0
Sig	02.08.17	15.997	2.055	2.70E+06	1.32E+06	9.72E+05	5.13E+05	8.10E+04	0
Sig	03.08.17	16.832	2.182	2.55E+06	1.83E+06	9.93E+05	2.95E+05	5.40E+04	0
Sig	04.08.17	18.734	3.251	1.12E+07	6.50E+06	2.69E+06	4.80E+05	3.00E+04	0
Sig	09.08.17	22.064	3.045	4.64E+07	8.29E+07	4.79E+07	1.08E+07	5.80E+05	0
Sig	10.08.17	22.041	2.694	2.00E+07	3.34E+07	1.82E+07	4.23E+06	1.30E+05	0
Sig	11.08.17	20.230	4.490	9.72E+06	1.05E+07	5.75E+06	1.93E+06	3.30E+05	4.00E+04
Sig	12.08.17	18.666	4.551	8.52E+06	8.49E+06	3.71E+06	1.13E+06	1.33E+05	0
Sig	14.08.17	19.269	5.154	1.82E+07	1.77E+07	1.01E+07	2.65E+06	3.50E+05	0
Sig	15.08.17	19.918	1.855	2.07E+06	1.56E+06	9.83E+05	2.18E+05	5.50E+04	0
Sig	16.08.17	22.284	1.523	1.83E+07	2.45E+07	1.33E+07	2.77E+06	2.30E+05	0
Sig	17.08.17	21.384	2.978	2.10E+07	1.85E+07	8.83E+06	2.45E+06	3.60E+05	0
Sig	18.08.17	20.574	3.080	9.04E+06	5.60E+06	2.85E+06	7.56E+05	1.03E+05	0
Sig	19.08.17	22.836	2.388	6.42E+06	5.32E+06	3.42E+06	9.50E+05	1.52E+05	0
Sig	20.08.17	23.049	2.321	3.69E+07	6.64E+07	4.57E+07	1.98E+07	2.63E+06	6.00E+04
Sig	21.08.17	22.127	1.991	5.52E+07	1.04E+08	7.10E+07	2.22E+07	2.50E+06	1.00E+05
Sig	22.08.17	21.126	3.011	4.74E+07	8.96E+07	5.80E+07	1.73E+07	1.45E+06	0
Sig	20.07.17	15.915	4.620	2.11E+06	1.15E+06	7.38E+05	7.12E+05	1.27E+05	0
Sig	21.07.17	14.153	3.830	2.12E+06	1.25E+06	4.24E+05	2.74E+05	0	0
Sig	26.07.17	20.989	2.550	3.05E+07	5.15E+07	3.06E+07	6.54E+06	3.10E+05	0
Sig	27.07.17	21.563	2.092	2.95E+07	5.97E+07	3.74E+07	5.75E+06	4.30E+05	0
Sig	28.07.17	22.325	2.318	3.58E+07	6.28E+07	3.54E+07	5.81E+06	2.00E+05	0
Sig	29.07.17	21.971	4.438	3.20E+07	5.78E+07	3.10E+07	4.68E+06	1.00E+05	0
Sig	30.07.17	19.823	4.874	1.04E+08	4.09E+07	9.80E+06	2.10E+06	3.00E+05	0

Table S 3: Minimum, maximum and median horizontal daily basis mass deposition rate (**mg/(m²d)**) measured by **Horizontal deposition samplers**. Mass deposition rate in each size interval is also shown

MW=MWAC, BS=BSNE

Samp. Id.	Date	Temp. (°C)	Wind Speed (m/s)	Mass deposition rate (mg/(m²d))					
				Size interval (aerodynamic diameter)					
				1-2 µm	2-4 µm	4-8 µm	8-16 µm	16-32 µm	32-64 µm
MW	02.08.17	15.997	2.055	0.053	0.3195	3.5756	18.9069	12.3191	0
MW	04.08.17	18.734	3.251	0.0308	0.1555	0.7479	0.9514	2.5171	0
MW	08.08.17	22.889	4.303	0.573	4.788	63.067	431.618	596.928	18.604
MW	09.08.17	22.064	3.045	0.3805	3.7223	53.2968	357.1174	276.0571	12.5649
MW	10.08.17	22.041	2.694	0.2763	3.1587	29.7283	207.9945	321.5826	53.2269
MW	12.08.17	18.666	4.551	1.1247	6.0944	49.9189	246.8832	180.6267	0
MW	14.08.17	19.269	5.154	3.1606	10.8308	87.7027	518.3101	513.3998	110.1782
MW	15.08.17	19.918	1.855	0.1272	0.742	5.9049	33.331	84.2202	0
MW	17.08.17	21.384	2.978	0.0619	0.5264	4.8274	36.7475	36.8723	26.7913
MW	18.08.17	20.574	3.080	0.1162	0.6434	4.26	21.1639	29.4541	47.5157
MW	19.08.17	22.836	2.388	0.059	0.4633	4.7649	21.8155	29.468	6.373
MW	21.08.17	22.127	1.991	0.2617	3.1625	17.5533	33.4467	24.5892	6.2844
MW	22.08.17	21.126	3.011	0.2238	2.7402	39.8506	288.9442	225.7404	24.2119
MW	20.07.17	15.915	4.620	0.1951	1.2363	12.9435	50.1497	120.0182	51.0725
MW	21.07.17	14.153	3.830	0.0234	0.1781	1.9931	7.0882	8.4802	2.4772
MW	22.07.17	15.603	2.559	0.0059	0.0165	0.0728	0.2085	0.3042	0
MW	23.07.17	17.732	4.427	0.0219	0.1316	1.4648	7.4614	6.4594	12.1317
MW	26.07.17	20.989	2.550	0.1499	1.7981	9.1141	11.8906	1.866	0
MW	27.07.17	21.563	2.092	0.1436	2.5401	16.6638	30.1571	9.0439	0
MW	28.07.17	22.325	2.318	0.1674	2.6065	12.0603	35.6525	24.0122	0
MW	29.07.17	21.971	4.438	0.2055	2.4908	42.7172	163.4428	109.8901	0
MW	30.07.17	19.823	4.874	0.0576	0.4659	2.2444	5.989	7.0296	0
BS	03.08.17	16.832	2.182	0.0137	0.077	0.3143	0.7407	3.8354	0
BS	04.08.17	18.734	3.251	0.0193	0.1162	0.5597	1.6363	1.2249	0
BS	05.08.17	21.383	5.379	0.0506	0.6417	3.5234	8.293	9.3819	3.3068
BS	06.08.17	22.347	6.790	0.3858	5.0476	45.0073	159.0974	75.0699	26.4677
BS	07.08.17	22.706	4.842	0.6379	9.1193	51.2209	130.3214	80.8477	0
BS	08.08.17	22.889	4.303	0.7554	6.9688	36.7909	125.2447	88.1866	0
BS	09.08.17	22.064	3.045	0.3203	3.0439	13.5882	33.253	16.5779	21.672
BS	10.08.17	22.041	2.694	0.194	2.0181	8.6547	17.7228	10.3509	0
BS	12.08.17	18.666	4.551	0.037	0.3435	2.2437	8.2023	6.6773	4.2183
BS	14.08.17	19.269	5.154	0.1175	0.9683	7.6959	32.4113	37.7385	3.5343
BS	16.08.17	22.284	1.523	0.0036	0.0253	0.1168	0	0	0
BS	18.08.17	20.574	3.080	0.0403	0.2139	1.0044	3.4598	2.1027	0

BS	20.08.17	23.049	2.321	0.2178	2.2909	13.381	48.7953	48.1988	0
BS	21.08.17	23.049	1.991	0.3135	4.0807	21.3125	59.5899	52.2078	121.0427
BS	24.07.17	20.758	3.883	0.2912	3.0925	14.4286	33.4588	28.8779	0
BS	25.07.17	20.784	2.055	0.3448	2.9782	23.8669	15.4882	2.9016	0
BS	26.07.17	20.989	2.550	0.1655	1.8011	7.0431	15.266	3.2846	0
BS	27.07.17	21.563	2.092	0.2367	2.3747	9.1715	14.3749	2.402	0
BS	28.07.17	22.325	2.318	0.2228	2.2278	8.9356	9.8436	1.0245	0
BS	29.07.17	21.971	4.438	0.1944	2.3734	11.0921	20.7425	10.5312	4.1926
BS	30.07.17	19.823	4.874	0.0469	0.5442	2.8858	9.4036	5.3719	0

Table S 4: Minimum, maximum and median horizontal daily basis number deposition rate ($1/(m^2d)$) measured by **Horizontal deposition samplers**. Number deposition rate in each size interval is also shown

MW=MWAC, BS=BSNE

Samp. Id.	Date	Temp. (°C)	Wind Speed (m/s)	Number deposition rate $1/(m^2d)$					
				Size interval (aerodynamic diameter)					
				1-2 μm	2-4 μm	4-8 μm	8-16 μm	16-32 μm	32-64 μm
MW	02.08.17	15.997	2.055	1.10E+07	9.09E+06	1.02E+07	7.47E+06	7.70E+05	0
MW	04.08.17	18.734	3.251	7.12E+06	4.26E+06	2.35E+06	4.20E+05	8.40E+04	0
MW	08.08.17	22.889	4.303	1.06E+08	1.29E+08	1.71E+08	1.86E+08	3.41E+07	2.00E+05
MW	09.08.17	22.064	3.045	7.20E+07	9.20E+07	1.40E+08	1.49E+08	1.66E+07	1.00E+05
MW	10.08.17	22.041	2.694	4.75E+07	8.06E+07	8.56E+07	8.75E+07	2.04E+07	4.80E+05
MW	12.08.17	18.666	4.551	2.21E+08	1.76E+08	1.47E+08	1.07E+08	1.42E+07	0
MW	14.08.17	19.269	5.154	6.09E+08	3.49E+08	2.46E+08	2.21E+08	3.26E+07	1.20E+06
MW	15.08.17	19.918	1.855	2.57E+07	2.04E+07	1.67E+07	1.33E+07	4.02E+06	0
MW	17.08.17	21.384	2.978	1.10E+07	1.33E+07	1.41E+07	1.58E+07	2.08E+06	9.00E+04
MW	18.08.17	20.574	3.080	2.22E+07	1.83E+07	1.27E+07	9.05E+06	1.76E+06	2.30E+05
MW	19.08.17	22.836	2.388	1.08E+07	1.12E+07	1.36E+07	1.00E+07	1.82E+06	8.00E+04
MW	21.08.17	22.127	1.991	4.54E+07	7.94E+07	6.27E+07	1.72E+07	1.32E+06	7.00E+04
MW	22.08.17	21.126	3.011	4.07E+07	6.93E+07	1.07E+08	1.24E+08	1.49E+07	1.00E+05
MW	20.07.17	15.915	4.620	3.67E+07	3.23E+07	3.71E+07	2.25E+07	5.07E+06	2.90E+05
MW	21.07.17	14.153	3.830	2.73E+07	2.67E+07	3.21E+07	1.68E+07	2.74E+06	1.50E+05
MW	22.07.17	15.603	2.559	1.33E+06	4.42E+05	1.63E+05	9.30E+04	2.30E+04	0
MW	23.07.17	17.732	4.427	4.31E+06	3.82E+06	3.87E+06	3.55E+06	4.33E+05	2.70E+04
MW	26.07.17	20.989	2.550	2.66E+07	4.53E+07	3.34E+07	6.39E+06	1.80E+05	0
MW	27.07.17	21.563	2.092	2.50E+07	6.16E+07	5.73E+07	1.62E+07	5.60E+05	0
MW	28.07.17	22.325	2.318	2.81E+07	6.41E+07	4.25E+07	1.51E+07	1.82E+06	0
MW	29.07.17	21.971	4.438	3.80E+07	5.98E+07	1.13E+08	8.17E+07	7.80E+06	0
MW	30.07.17	19.823	4.874	1.20E+07	1.23E+07	8.23E+06	2.59E+06	3.50E+05	0

BS	03.08.17	16.832	2.182	2.67E+06	2.17E+06	1.09E+06	3.29E+05	9.90E+04	0
BS	04.08.17	18.734	3.251	4.43E+06	3.20E+06	1.92E+06	6.94E+05	9.90E+04	0
BS	05.08.17	21.383	5.379	9.16E+06	1.64E+07	1.20E+07	4.15E+06	4.90E+05	4.00E+04
BS	06.08.17	22.347	6.790	6.61E+06	1.27E+07	1.39E+07	7.15E+06	6.30E+05	3.00E+04
BS	07.08.17	22.706	4.842	1.06E+08	2.32E+08	1.72E+08	5.82E+07	6.40E+06	0
BS	08.08.17	22.889	4.303	1.44E+08	1.79E+08	1.29E+08	5.15E+07	7.70E+06	0
BS	09.08.17	22.064	3.045	5.65E+07	7.88E+07	5.07E+07	1.62E+07	1.01E+06	2.00E+05
BS	10.08.17	22.041	2.694	3.35E+07	5.33E+07	3.11E+07	9.35E+06	8.30E+05	0
BS	12.08.17	18.666	4.551	7.11E+06	8.52E+06	6.52E+06	3.50E+06	5.08E+05	2.80E+04
BS	14.08.17	19.269	5.154	2.45E+07	2.59E+07	2.36E+07	1.39E+07	2.10E+06	4.00E+04
BS	16.08.17	22.284	1.523	6.98E+05	7.62E+05	4.44E+05	0	0	0
BS	18.08.17	20.574	3.080	8.63E+06	6.30E+06	3.38E+06	1.63E+06	2.08E+05	0
BS	20.08.17	23.049	2.321	3.65E+07	6.08E+07	4.45E+07	2.19E+07	3.23E+06	0
BS	21.08.17	23.049	1.991	5.14E+07	1.01E+08	7.45E+07	2.65E+07	3.30E+06	2.00E+05
BS	24.07.17	20.758	3.883	5.28E+07	7.98E+07	4.97E+07	1.60E+07	1.96E+06	0
BS	25.07.17	20.784	2.055	6.03E+07	7.79E+07	3.61E+07	8.75E+06	2.40E+05	0
BS	26.07.17	20.989	2.550	2.95E+07	4.74E+07	2.66E+07	7.58E+06	2.90E+05	0
BS	27.07.17	21.563	2.092	4.11E+07	6.26E+07	3.46E+07	7.21E+06	2.00E+05	0
BS	28.07.17	22.325	2.318	3.95E+07	5.91E+07	3.33E+07	5.38E+06	1.00E+05	0
BS	29.07.17	21.971	4.438	3.27E+07	6.05E+07	3.87E+07	1.03E+07	7.50E+05	5.00E+04
BS	30.07.17	19.823	4.874	8.72E+06	1.35E+07	1.00E+07	4.23E+06	4.70E+05	0

Table S 5: Minimum, maximum and median upward and downward daily basis mass deposition rate (**mg/(m²d)**) measured by Flat plate sampler (25mm) specified in size intervals (μm). Mass deposition rate in each size interval is also shown.

FP_U=Upward deposition rate, FP_D=Downward deposition rate

Samp. Id.	Date	Temp. (°C)	Wind speed (m/s)	Mass deposition rate (mg/(m²d))					
				Size interval (aerodynamic diameter)					
				1-2 μm	2-4 μm	4-8 μm	8-16 μm	16-32 μm	32-64 μm
FP_U	20.07.17	15.915	4.620	0.006	0.0126	0.0071	0.1607	0	0
FP_U	21.07.17	14.153	3.830	0.0085	0.0128	0.1135	0.2452	0	0
FP_U	24.07.17	20.758	3.883	0.0129	0.0456	0.2431	0.5339	0	0
FP_U	25.07.17	20.784	2.055	0.0251	0.0397	0.2362	0	0	0
FP_U	26.07.17	20.989	2.550	0.0104	0.0803	0.1911	0.0924	0	0
FP_U	27.07.17	21.563	2.092	0.0065	0.0223	0.0759	0.2792	0.6606	0
FP_U	28.07.17	22.325	2.318	0.0225	0.0375	0.1186	0.0279	0	0
FP_U	29.07.17	21.971	4.438	0.021	0.0444	0.1147	0.2817	0.2653	0
FP_D	20.07.17	15.915	4.620	0.0153	0.0578	0.2786	0.8438	0.2835	0

FP_D	21.07.17	14.153	3.830	0.0357	0.1865	1.0712	3.7204	2.787	0
FP_D	24.07.17	20.758	3.883	0.227	2.7686	7.7674	5.2542	7.7463	0
FP_D	25.07.17	20.784	2.055	0.2505	2.414	8.6004	9.5165	4.7043	0
FP_D	26.07.17	20.989	2.550	0.1151	1.4906	5.555	6.5666	3.226	0
FP_D	27.07.17	21.563	2.092	0.1608	2.1048	8.2862	10.0201	2.0881	0
FP_D	28.07.17	22.325	2.318	0.1585	1.8237	7.0338	7.517	1.2685	0
FP_D	29.07.17	21.971	4.438	0.154	2.0606	9.0657	8.783	2.9589	0

Table S 6: Minimum, maximum and median upward and downward daily basis number deposition rate ($1/(m^2d)$) measured by Flat plate sampler (25mm) specified in size intervals (μm). Number deposition rate in each size interval is also shown

FP_U=Upward deposition rate, FP_D=Downward deposition rate.

Samp. Id.	Date	Temp ($^{\circ}C$)	Wind speed (m/s)	Number deposition rate, $1/(m^2d)$					
				Size interval (aerodynamic diameter)					
				1-2 μm	2-4 μm	4-8 μm	8-16 μm	16-32 μm	32-64 μm
FP_U	20.07.17	15.915	4.620	1.70E+06	4.60E+05	3.50E+04	7.10E+04	0	0
FP_U	21.07.17	14.153	3.830	1.86E+06	5.32E+05	3.63E+05	1.21E+05	0	0
FP_U	24.07.17	20.758	3.883	2.68E+06	1.28E+06	8.35E+05	3.44E+05	0	0
FP_U	25.07.17	20.784	2.055	4.99E+06	1.28E+06	9.14E+05	0	0	0
FP_U	26.07.17	20.989	2.550	2.33E+06	2.15E+06	7.46E+05	6.80E+04	0	0
FP_U	27.07.17	21.563	2.092	1.40E+06	6.74E+05	2.89E+05	9.60E+04	2.40E+04	0
FP_U	28.07.17	22.325	2.318	4.84E+06	1.20E+06	5.19E+05	2.70E+04	0	0
FP_U	29.07.17	21.971	4.438	4.84E+06	1.20E+06	5.19E+05	2.70E+04	0	0
FP_D	20.07.17	15.915	4.620	3.81E+06	1.82E+06	9.61E+05	3.64E+05	3.30E+04	0
FP_D	21.07.17	14.153	3.830	7.68E+06	6.33E+06	3.75E+06	1.84E+06	1.94E+05	0
FP_D	24.07.17	20.758	3.883	3.90E+07	7.12E+07	3.37E+07	3.25E+06	6.20E+05	0
FP_D	25.07.17	20.784	2.055	4.43E+07	6.54E+07	3.30E+07	5.41E+06	2.70E+05	0
FP_D	26.07.17	20.989	2.550	2.03E+07	3.77E+07	2.11E+07	3.41E+06	2.80E+05	0
FP_D	27.07.17	21.563	2.092	2.61E+07	5.22E+07	3.10E+07	5.26E+06	2.10E+05	0
FP_D	28.07.17	22.325	2.318	2.75E+07	4.70E+07	2.61E+07	4.41E+06	1.30E+05	0
FP_D	29.07.17	21.971	4.438	2.59E+07	5.27E+07	3.50E+07	4.81E+06	2.40E+05	0

Table S 7: Summary of regression analysis for correlation between calculated dust concentration and OPC measurement

Sampler	Calculated concentration vs OPC measured concentration		
	r^2	p-value	slope
Flat plate	0.449	0.0241	0.4084
MWAC	0.243	0.214	0.1654
BSNE	0.968	4.70E-08	0.8046
Sigma-2	0.794	0.00127	0.6851

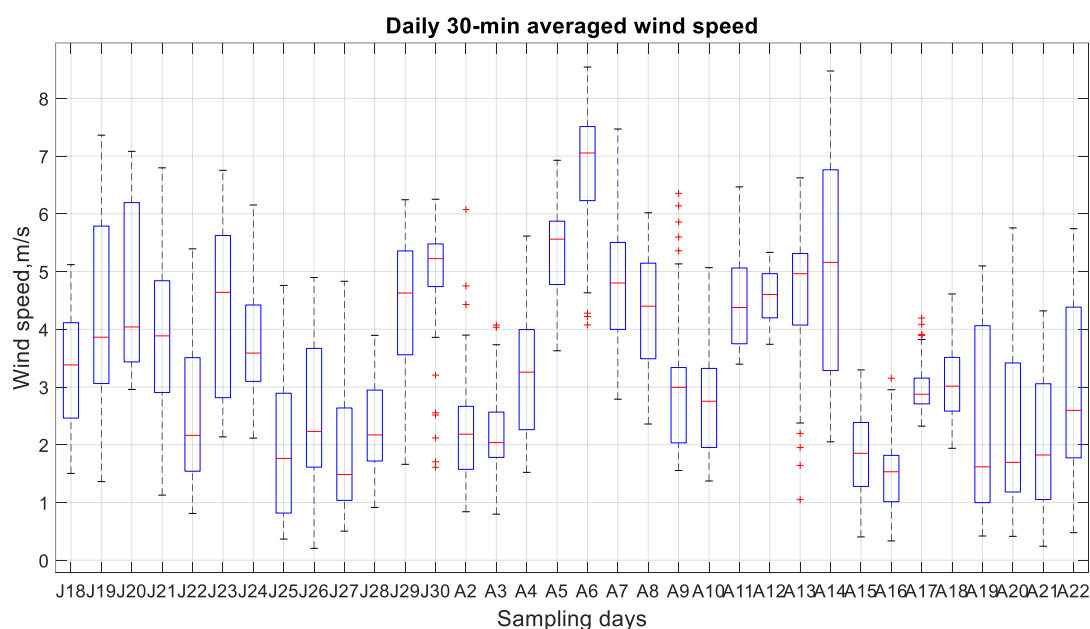


Figure S 1: Daily box-plots of 30-min averaged wind speed observed at Izaña Global Atmospheric watch Observatorio from 18/July/2017 to 23/August/2017 (e.g., each day was divided in 30-minute interval averages and then the mean and standard deviation was calculated from this data). On each blue box, the central mark is the median, the edges of the box are the 25th and 75th percentiles. The black vertical lines show the standard deviation (J=July, A=August).

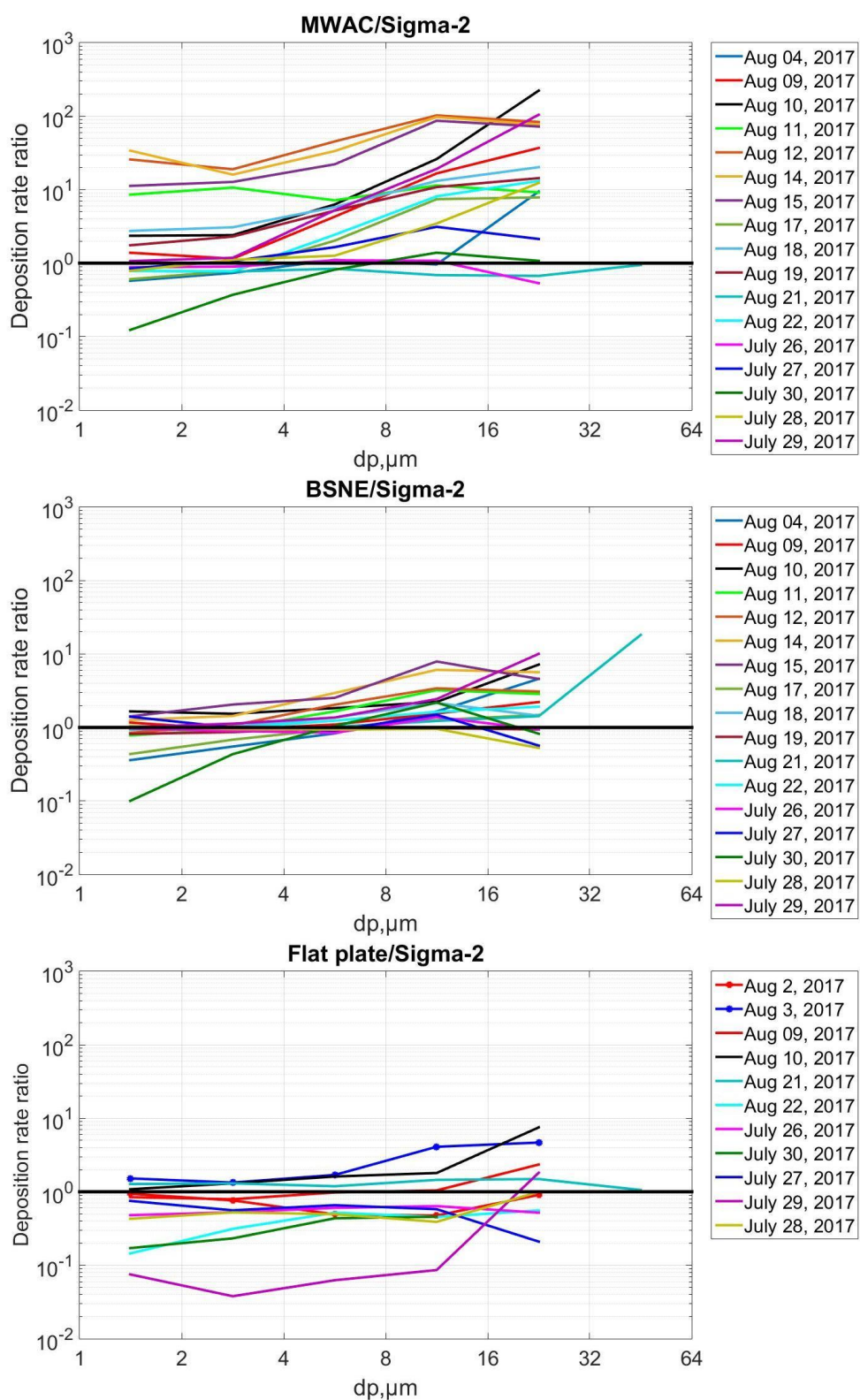


Figure S 2: Deposition rate ratio as function of particle size (MWAC/Sigma-2 (a), BSNE/Sigma-2 (b) and Flat plate/Sigma-2 (c)).

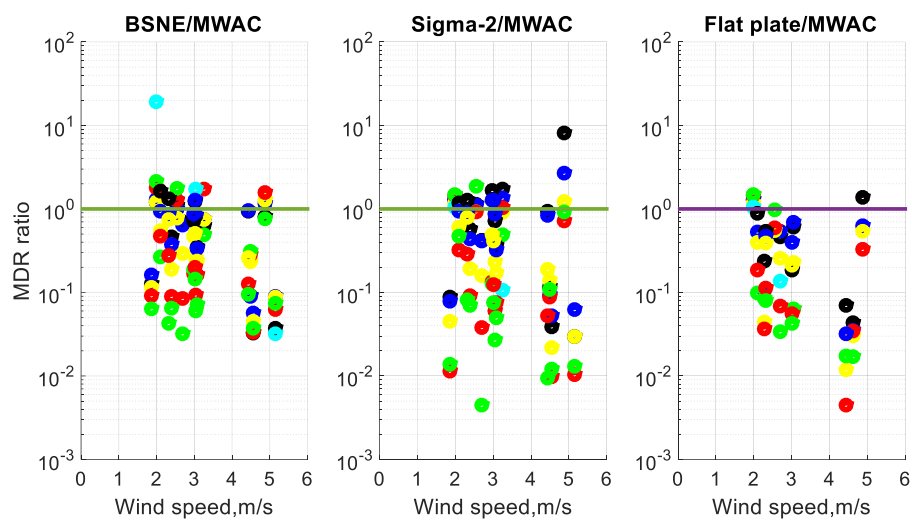


Figure S 3: Mass deposition rate (MDR) ratio as function of wind speed for different measurement days. Different colors represent deposition rates in different size intervals (black: 1-2 μm ; blue: 2-4 μm ; yellow: 4-8 μm ; red: 8-16 μm ; green: 16-32 μm ; cyan: 32-64 μm).

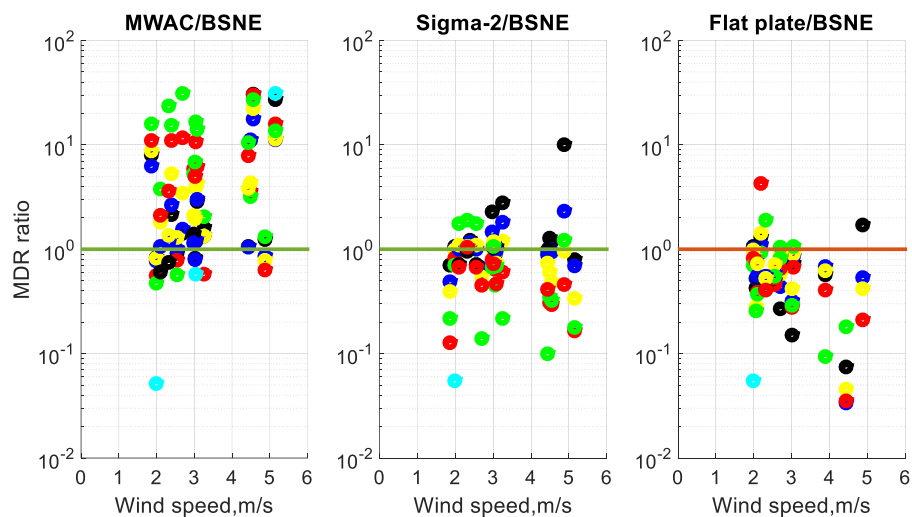


Figure S 4: Mass deposition rate (MDR) ratio as function of wind speed for different measurement days. Different colors represent deposition rates in different size intervals (black: 1-2 μm ; blue: 2-4 μm ; yellow: 4-8 μm ; red: 8-16 μm ; green: 16-32 μm ; cyan: 32-64 μm).

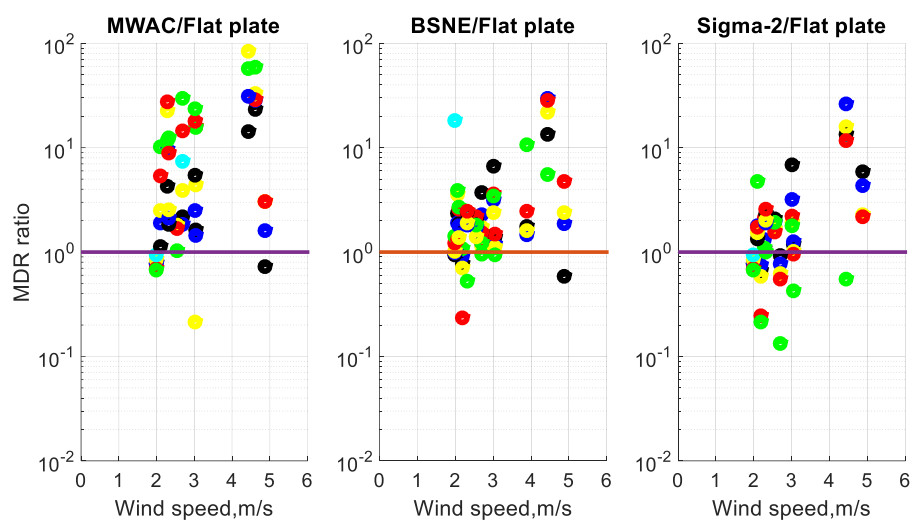


Figure S 5: Mass deposition rate (MDR) ratio as function of wind speed for different measurement days. Different colors represent deposition rates in different size intervals (black: 1-2 μm ; blue: 2-4 μm ; yellow: 4-8 μm ; red: 8-16 μm ; green: 16-32 μm ; cyan: 32-64 μm).

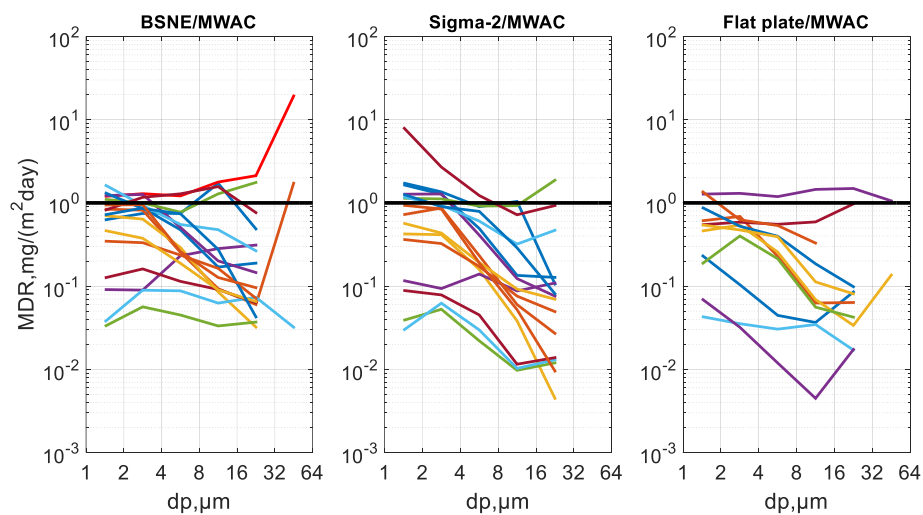


Figure S 6: Mass deposition rate (MDR) ratio as function of particle size (different colors show different for measurement days).

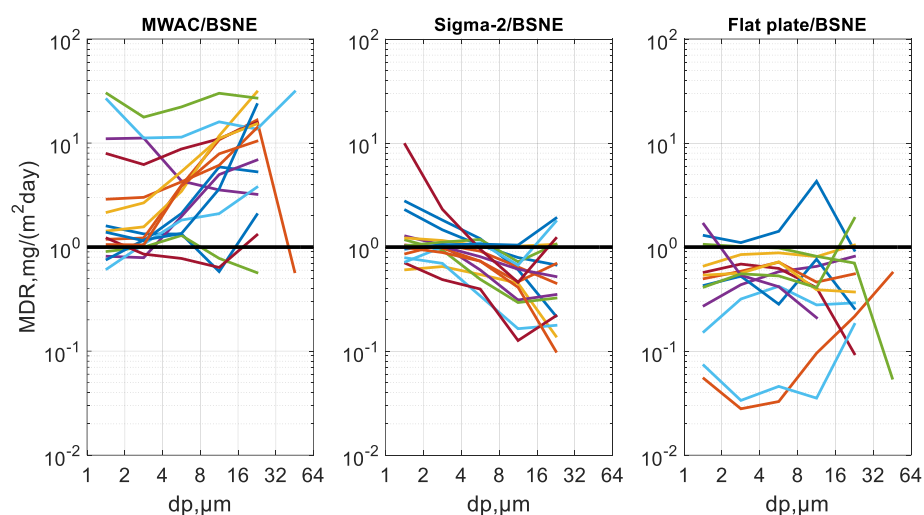


Figure S 7: Mass deposition rate (MDR) ratio as function of particle size (different colors show different for measurement days).

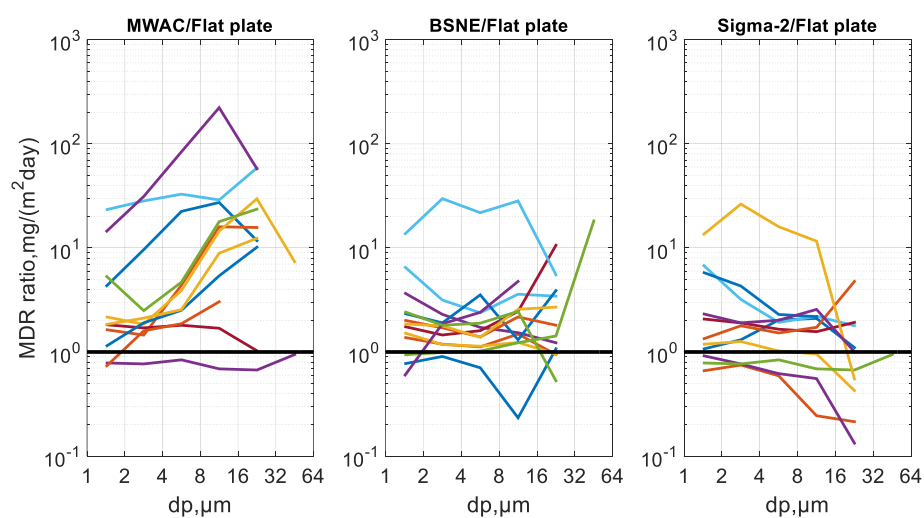


Figure S 8: Mass deposition rate (MDR) ratio as function of particle size (different colors show different for measurement days).

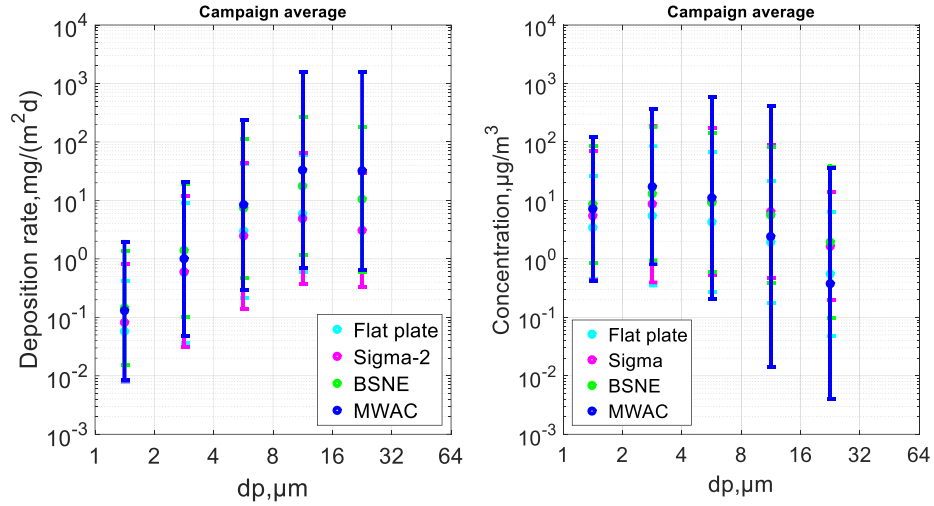


Figure S 9: Size-resolved mass concentration measured by different samplers (campaign data). Different deposition velocity models are used for concentration calculation (Flat plate: Piskunov; BSNE: Piskunov; MWAC: combination of Piskunov- and impaction curve). Error bars show the central 95% confidence interval.

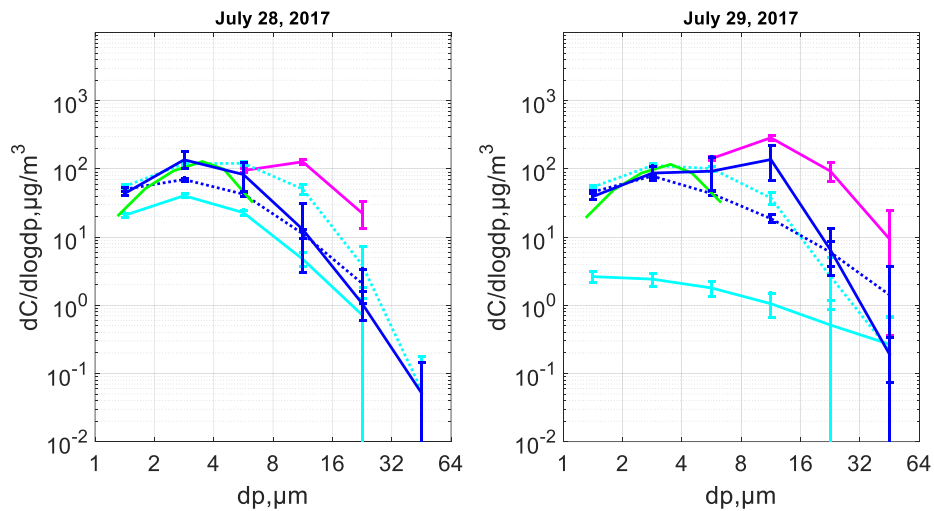


Figure S 10: Comparison of size resolved mass concentration measured by different samplers (a solid cyan: Flat plate; a dotted cyan: Sigma-2; solid blue: MWAC; dotted blue: BSNE with daily average mass concentration from FWI (magenta line) and OPC (green line) over different measurement days.

FWI measurement in each day is an average of three measurements taken every day (two days=6 samples).

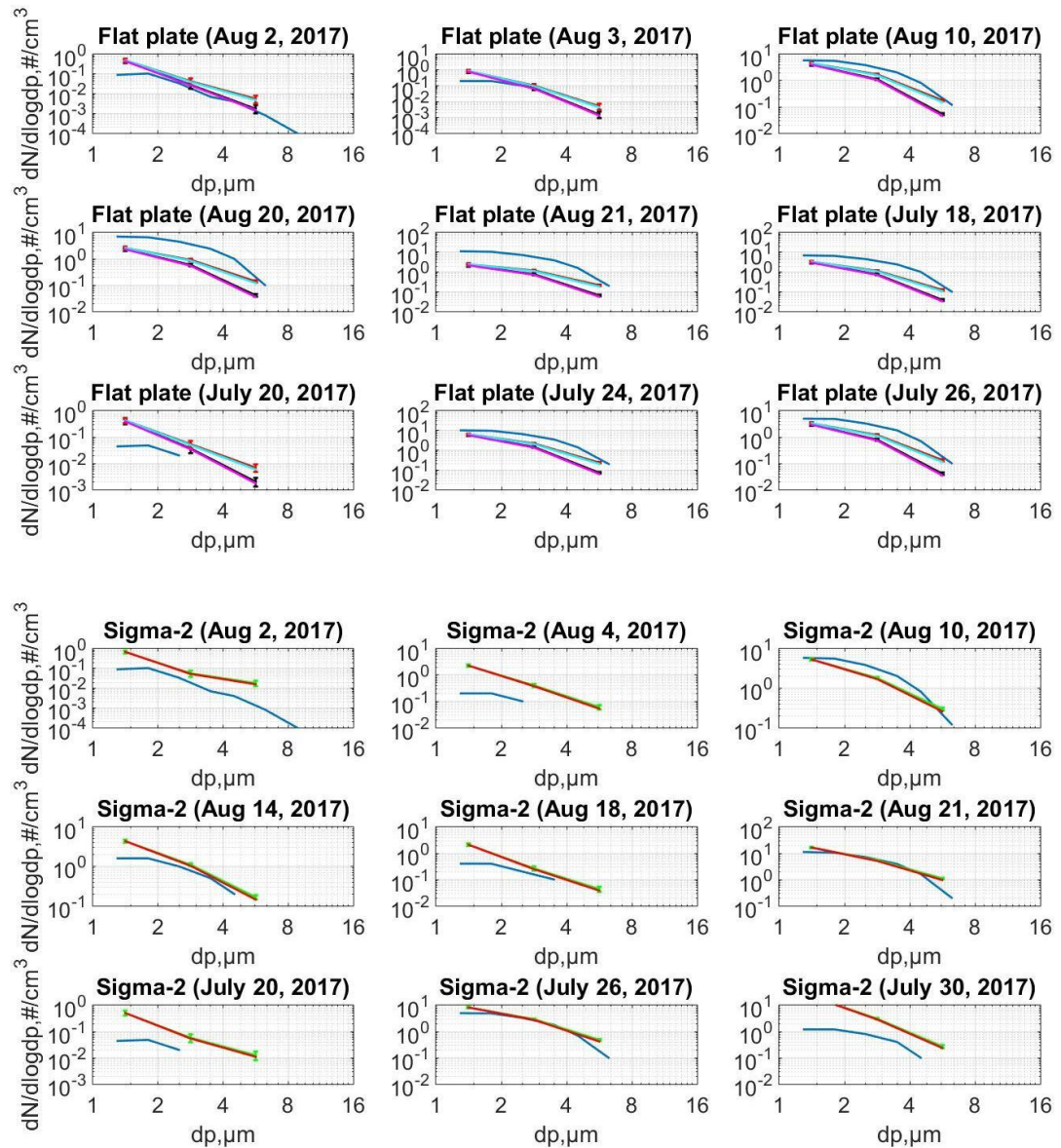


Figure S 11: Comparing number concentration calculated from deposition measurement (Flat plate and Sigma-2 samplers) (Red: Wood 1981; Black: Momentum flux; Cyan: Wood 1981-PM₁₀ inlet and Magenta: Momentum flux-PM₁₀ inlet) with number concentration by OPC measurement (Blue). Concentration calculation from Sigma-2 sampler considers only Stokes's velocity (without considering friction velocity) (Green: Stokes' velocity; Yellow: Stokes' velocity-PM₁₀ inlet using Stokes velocity). Error Bars show the central 95 % confidence interval.

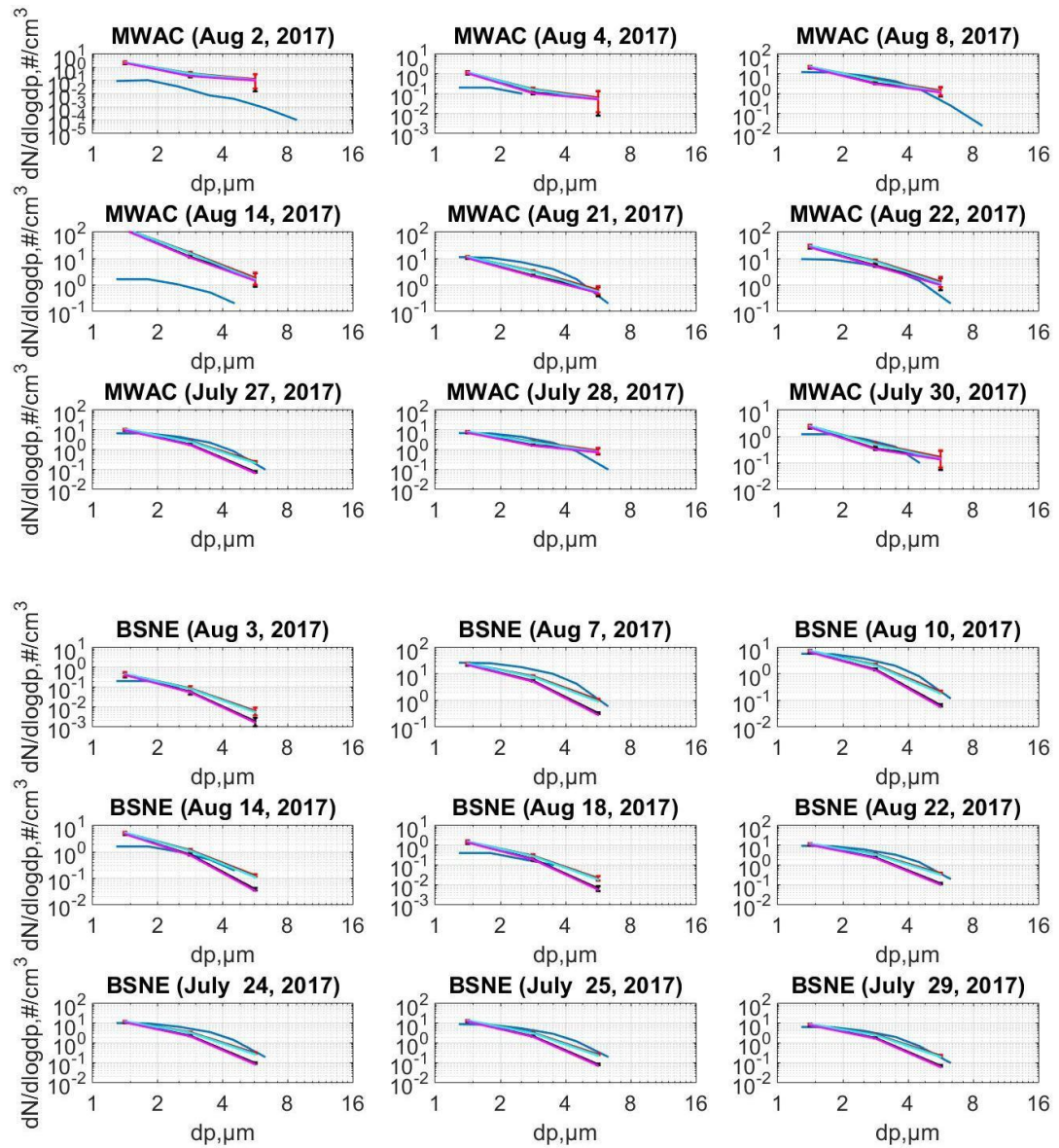


Figure S 12: Comparing number concentration calculated from deposition measurement (MWAC and BSNE samplers) (Red: Wood 1981; Black: Momentum flux; Cyan: Wood 1981-PM₁₀ inlet and Magenta: Momentum flux-PM₁₀ inlet) with number concentration by OPC measurement (Blue). Error Bars show the central 95 % confidence interval.

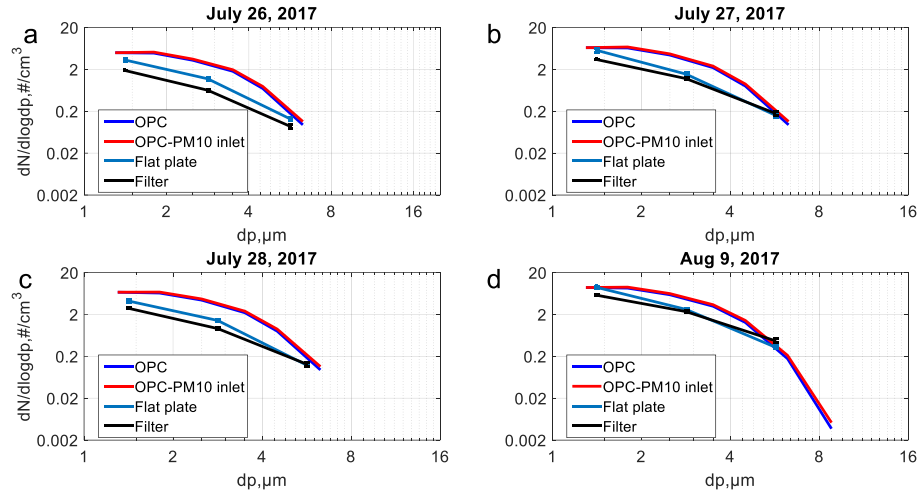


Figure S 13: Number concentration measured with Filter-sampler method, in comparison to Flat plate and OPC over different measurement days (a: July 26, 2017; b: July 27, 2017; c: July 28, 2017; d: July 29, 2017). Number concentration size distributions is obtained by converting the SEM obtained number deposition rate ($\#/(\text{m}^2\text{day})$) to number concentration using different deposition velocity models. The red curve shows OPC with PM_{10} inlet efficiency correction. The number concentration measurement shown by filter sampler is a daily average basis. Error bars show the central 95% confidence interval.

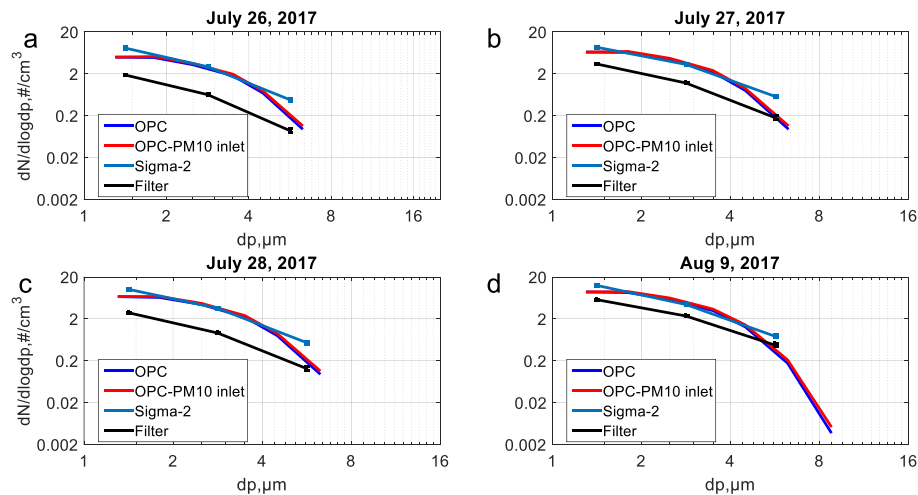


Figure S 14: Number concentration measured with Filter-sampler method, in comparison to Sigma-2 and OPC over different measurement days (a: July 26, 2017; b: July 27, 2017; c: July 28, 2017; d: July 29, 2017). Number concentration size distributions is obtained by converting the SEM obtained number deposition rate ($(\#/(m^2day))$) to number concentration using different deposition velocity models. The red curve shows OPC with PM_{10} inlet efficiency correction. The number concentration measurement shown by filter sampler is a daily average basis. Error bars show the central 95% confidence interval.

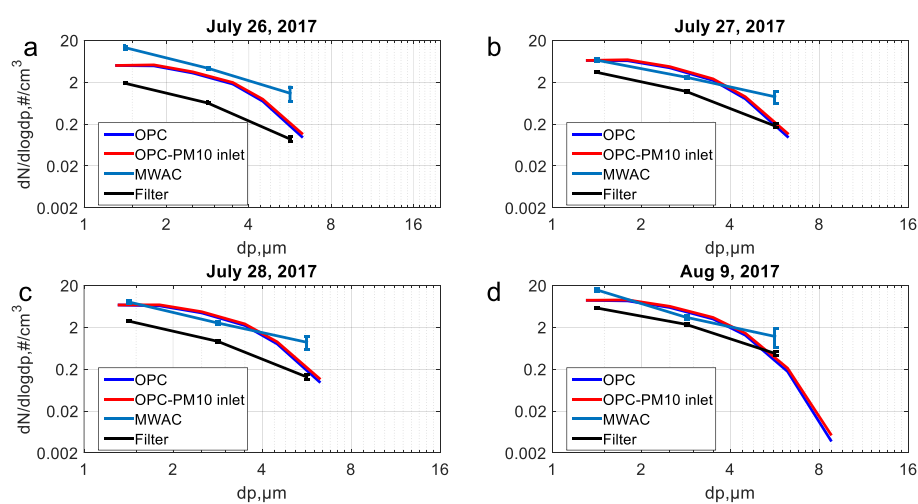


Figure S 15: Number concentration measured with Filter-sampler method, in comparison to MWAC and OPC over different measurement days (a: July 26, 2017; b: July 27, 2017; c: July 28, 2017; d: July 29, 2017). Number concentration size distributions is obtained by converting the SEM obtained number deposition rate ($(\#/(m^2day))$) to number concentration using different deposition velocity models. The red curve shows OPC with PM_{10} inlet efficiency correction. The number concentration measurement shown by filter sampler is a daily average basis. Error bars show the central 95% confidence interval.

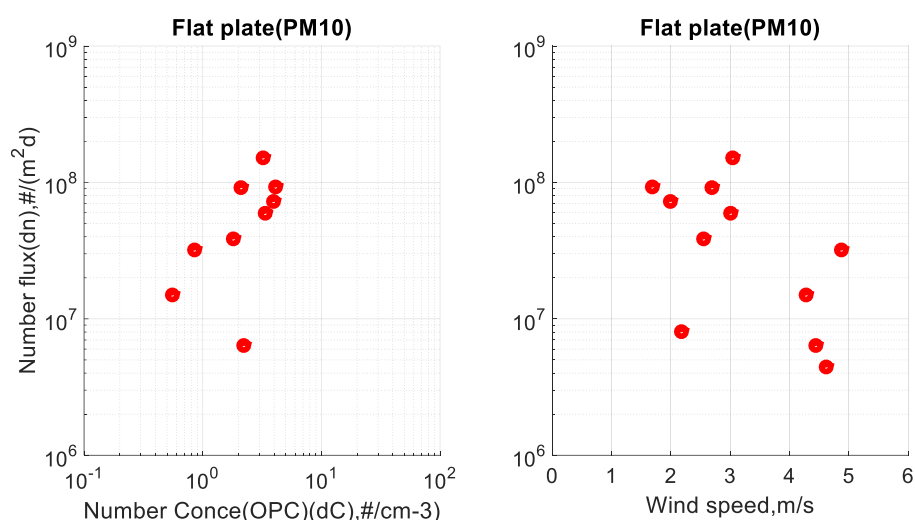


Figure S 16: Connection of deposition flux, OPC concentration, and meteorological factor (wind speed). (a) Number deposition rate of particles smaller than 10 μm estimated aerodynamic diameter observed with the flat plate sampler versus number concentration of PM₁₀ observed with the OPC. (b) number deposition rate of particles smaller than 10 μm estimated aerodynamic diameter observed with the flat plate sampler versus the average wind speed of the collection period.

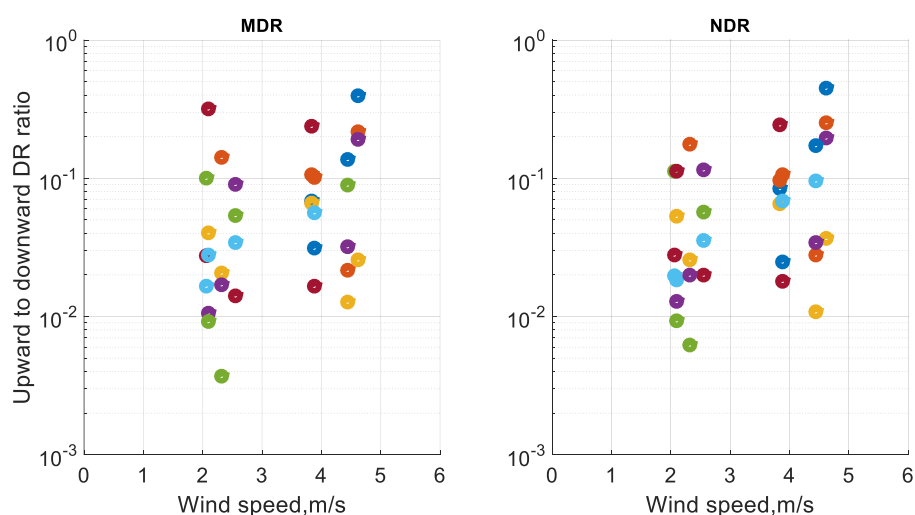


Figure S 17: Upward to downward deposition rate ratio vs wind speed. The deposition rates are measured using flat plate sampler (with 25 mm stub). Different colors represent different size intervals (blue: 1-2 μm ; orange: 2-4 μm ; yellow: 4-8 μm ; Violet: 8-16 μm ; green: 16-32 μm ; cyan: 32-64 μm).

2 Computational fluid dynamics (CFD) simulation

2.1 Detail of the sampler construction for CFD geometries

2.1.1 Flat plate sampler

The bottom part of the sampler is a cylinder with a diameter of 28.9 mm and a height of 29 mm followed by another cylinder with a diameter of 40 mm and a height of 14 mm. The first plate has a diameter of 127 mm and a thickness of 1 mm. In the middle of the area, the deposition area is defined as a circular surface with a diameter of 12 mm or 25 mm respectively. The upper plate has the same thickness but a diameter of 203.2 mm. Three columns hold the upper plate. The center of these columns is arranged on a diameter of 116 mm. The diameter of the columns is 5 mm with a height of 16 mm.

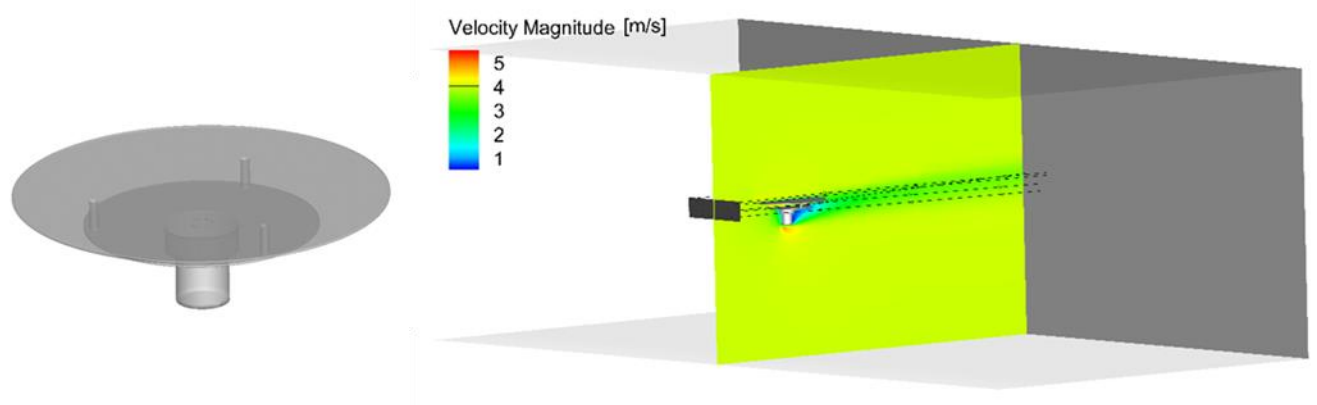


Figure S 18: Geometry of Flat plate sampler (left), CFD modeling domain and velocity magnitude, inlet velocity: 4m/s (right); in addition, the injection area is shown in black (width 0.2 m, height 0.05 m) along with exemplary particle trajectories.

2.1.2 Sigma-2 sampler

At the bottom, it consists of a mounting pole with an inner diameter of 36 mm and an outer diameter of 50 mm with a height of 32 mm. Then follows the bottom of the sampler with a diameter of 108 mm and a height of 14 mm. The wall of the geometry has an inner diameter of 104 mm and is 260 mm high. From a height of 214 mm the cover of the sampler starts. It has an inner diameter of 154 mm and an outer diameter of 158 mm. In it, there are four openings, which start at a height of 226 mm and have a width of 40 mm and a height of 75 mm. The same openings exist in the inner radius as well however turned by 90 degrees. The collector inside the geometry has a diameter of 12 mm, a height of 13 mm and is positioned centrally at the bottom.

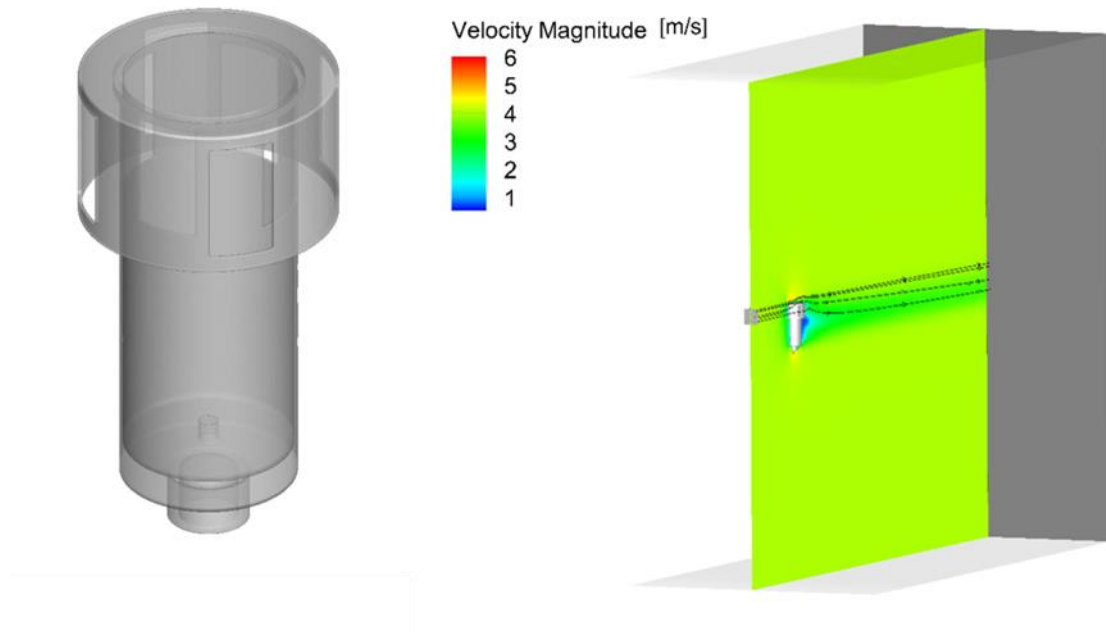


Figure S 19: Geometry of Sigma-2 sampler (left), CFD modeling domain and velocity magnitude; inlet velocity: 4m/s (right); in addition, the injection area is shown in black (width 0.2 m, height 0.1 m) along with exemplary particle trajectories.

2.1.3 MWAC sampler

The bottom diameter of the sampler is 48 mm with a thickness of 1.25 mm. Afterwards the inner diameter is 45.4 mm up to a height of 60 mm. The diameter then narrows semi circularly to 24 mm. The lid of the sampler has a diameter of 40 mm and a height of 17 mm.

The pipes have an inner diameter of 7.5 mm and a thickness of 1.25 mm. The pipe looking into the direction of the velocity inlet is longer and ends 23 mm above the bottom of the sampler. The outgoing pipe starts 38 mm above the bottom. The collector inside the geometry has a diameter of 12 mm, a height of 13 mm and is positioned centrally at the bottom.

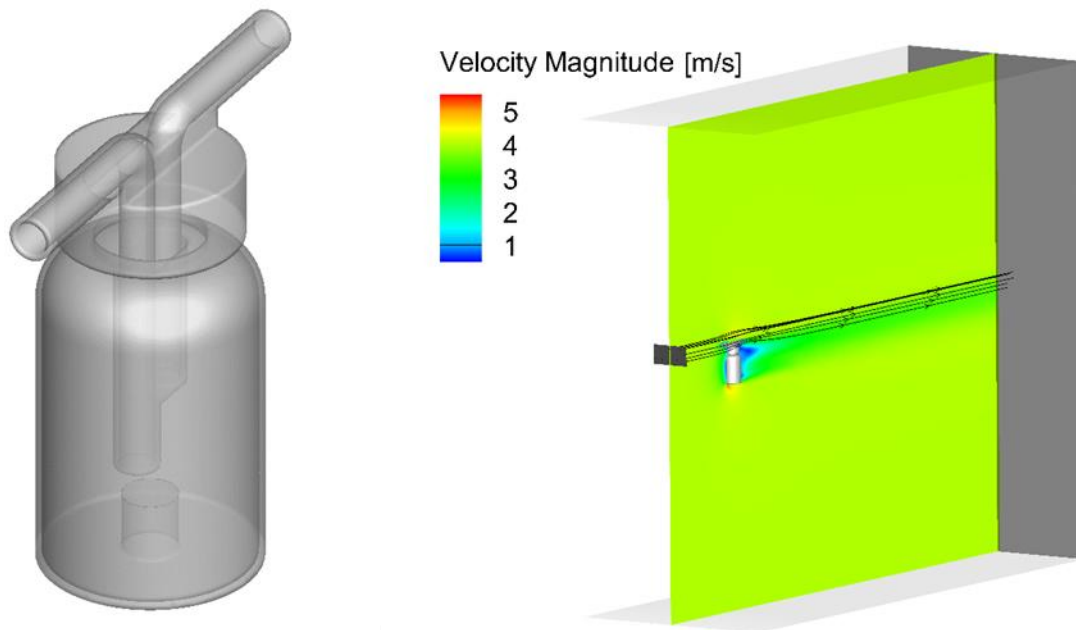


Figure S 20: Geometry of MWAC sampler (left), CFD modeling domain and velocity magnitude of MWAC sampler, inlet velocity: 4m/s (right); in addition, the injection area is shown in black (width 0.1 m, height 0.05 m) along with exemplary particle trajectories.

2.2 Results in the cross section of the flow domain

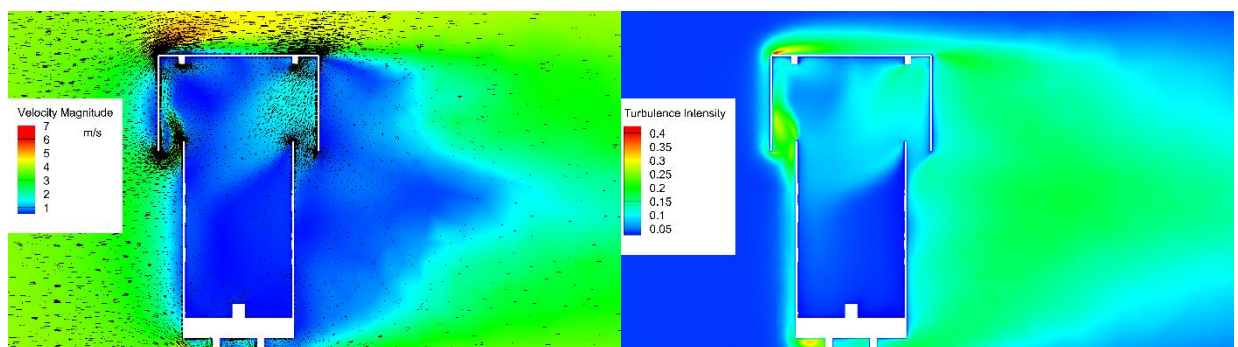


Figure S 21: Sigma-2 Sampler: Velocity magnitude and turbulence intensity at wind speed 4 m/s.

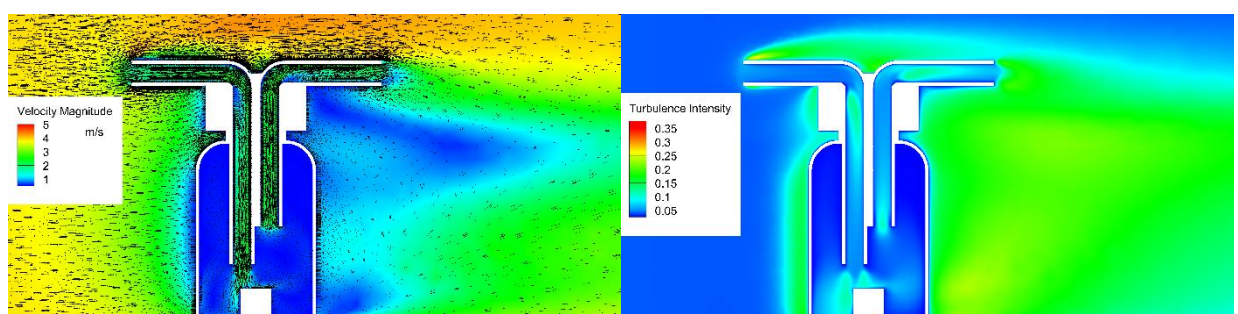


Figure S 22: MWAC Sampler: Velocity magnitude and turbulence intensity at wind speed 4 m/s.

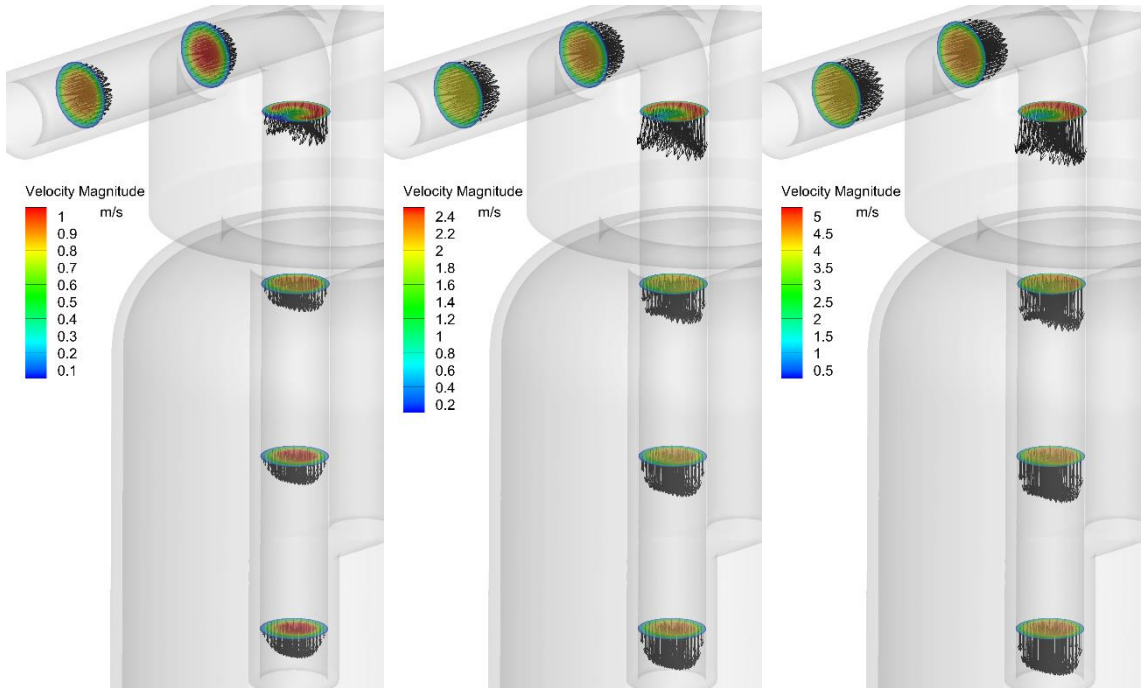


Figure S 23: Velocity vectors at 2, 4 and 8 m/s (cross sections across and along the inlet tube).

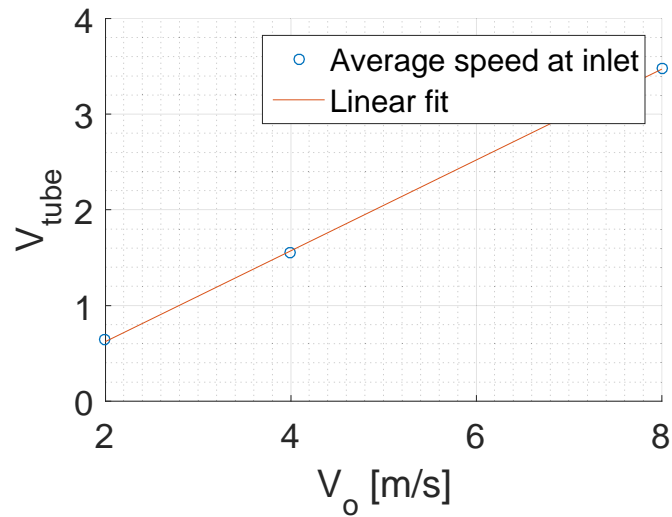


Figure S 24: Mean flow velocity (V_{tube}) in the MWAC tube as a function of the outside velocity (V_o).

Fitting curve: $V_{tube} = 0.47V_o - 0.33$ for the range 2 – 8 m/s.

2.3 CFD-derived deposition velocities at different wind speed

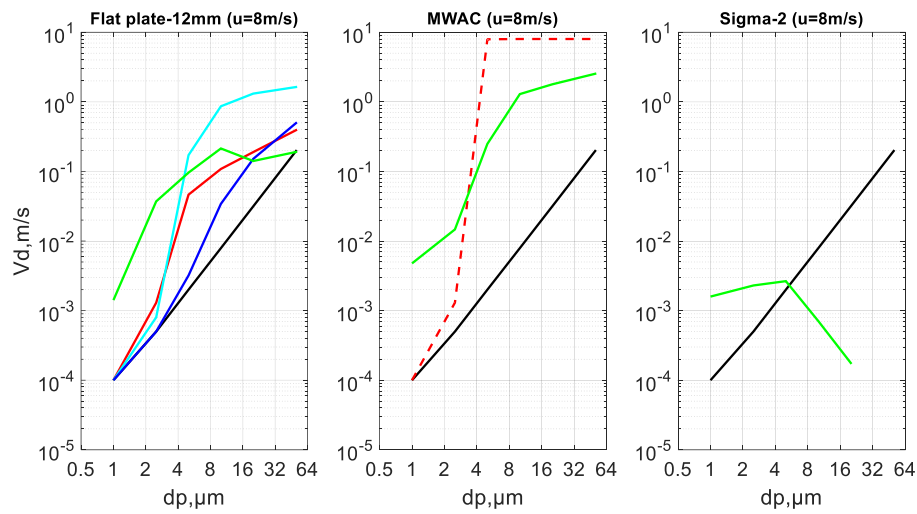


Figure S 25: Comparison of the CFD- derived deposition velocities of particles for different passive samplers to the analytical deposition velocity models used for the different samplers (at 8 m/s wind speed).

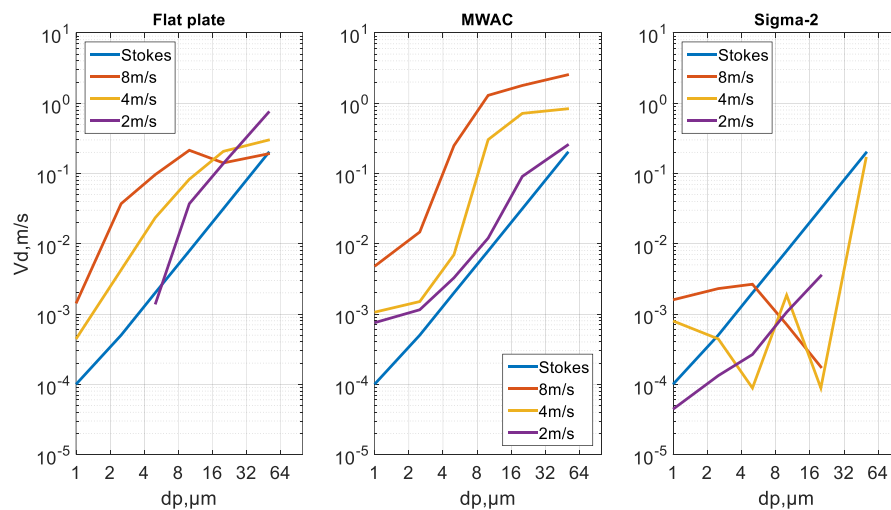


Figure S 26: Comparing the CFD-derived particle deposition velocities at at different wind speed values for different samplers.