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*Supplement of*

## **Is there an aerosol signature of chemical cloud processing?**

**Barbara Ervens et al.**

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This supplemental information includes:

**Table S1:** Initial gas-phase mixing ratios [ppb] used as input for the parcel model. Data are from SEACR<sup>4</sup>S for six different air masses.

**Figure S1:** Predicted relative mass concentration increase due to cloud processing in six air masses as identified during SEAC<sup>4</sup>RS. Black symbols show the measured, initial size distributions; colored symbols are model results, color-coded by absolute mass increase /  $\text{ng m}^{-3}$ .

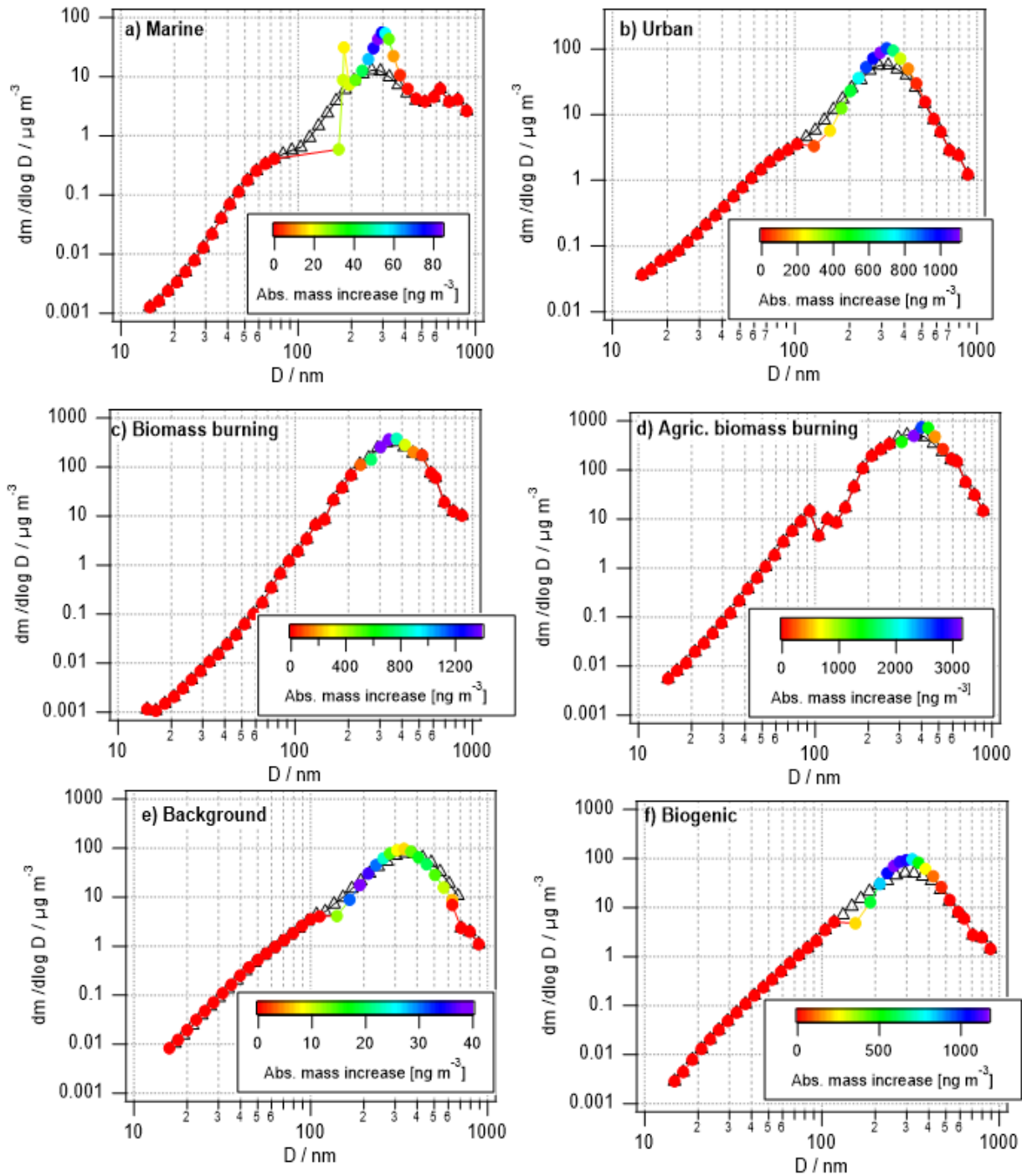
**Figure S2:** Predicted relative mass concentration increase due to cloud processing in six air masses as identified during SEAC<sup>4</sup>RS. Black symbols show the measured, initial size distributions; colored symbols are model results, color-coded by O/C ratio.

**Table S1:** Initial gas-phase mixing ratios [ppb].

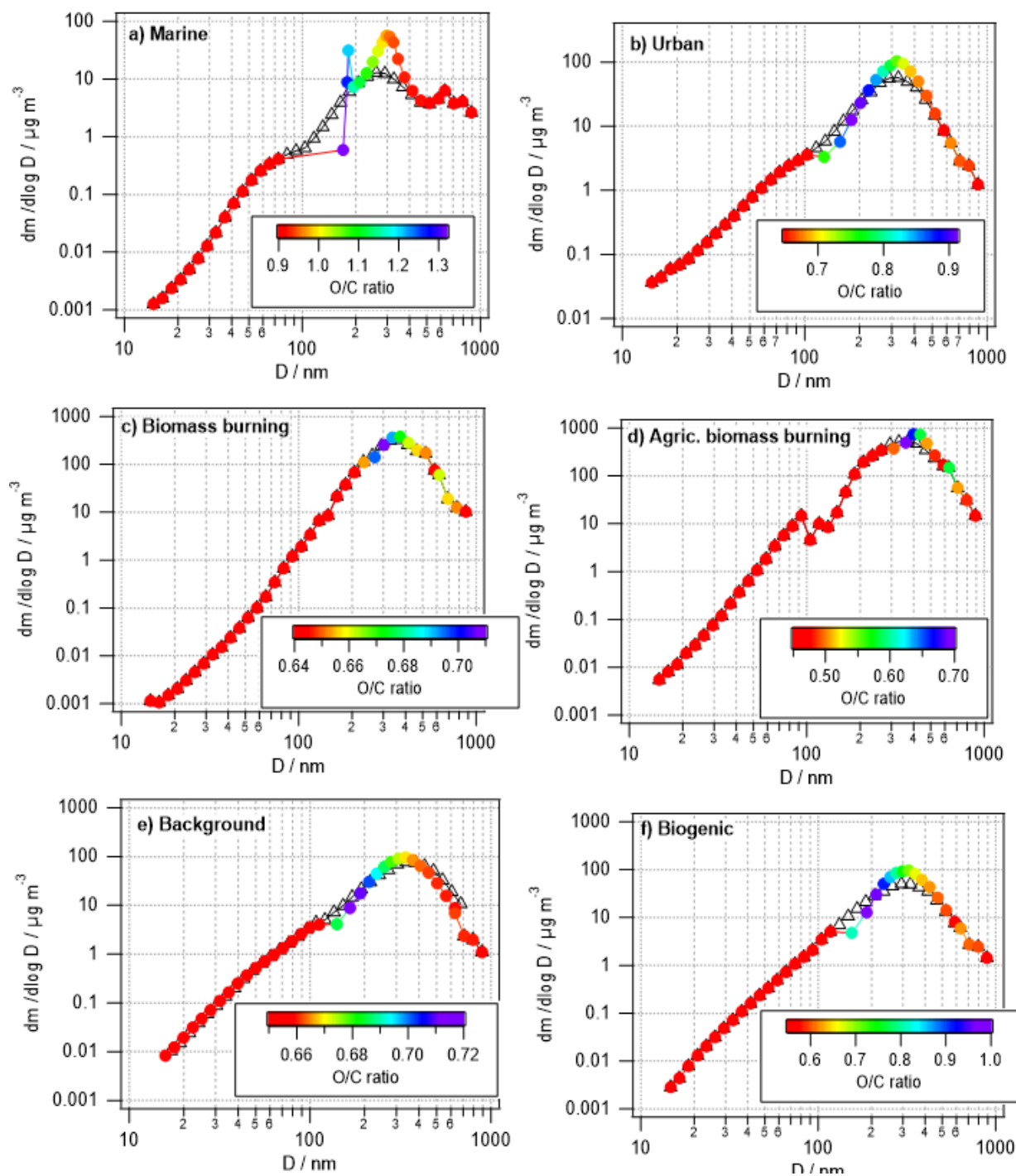
	Marine	Urban	Biomass Burning	Agric biomass burning	Back- ground	Biogenic
SO <sub>2</sub>	0.43	0.56	0.252	1.44	0.64	0.582
NO	0.028	0.2	0.137	0.352	0.112	0.062
NO <sub>2</sub>	0.066	1.196	0.311	2.37	0.521	0.283
HCHO	0.883	2.64	4.04	14.4	2.8	4.2
H <sub>2</sub> O <sub>2</sub>	1.172	2.58	3.72	4.3	2.6	2.8
O <sub>3</sub>	27	57	68	63	57	50
Isoprene	0.003	0.14	0.18	1.13	0.147	1.61
Monoterpenes	0.007	0.03	0.098	0.328	0.039	0.123
Methylvinyl ketone <sup>1)</sup>	0.008	0.124	0.113	0.33	0.18	1.1
Methacrolein <sup>1)</sup>	0.008	0.124	0.113	0.33	0.18	1.1
Toluene	0.009	0.07	0.125	0.243	0.041	0.056
Xylene <sup>2)</sup>	0.005	0.035	0.067	0.12	0.02	0.028
Ethylene	0.0486	0.215	0.842	2.68	0.212	0.191

<sup>1)</sup> The total of methyl vinyl ketone and methacrolein was measured by PTRMS. For model purposes, the total was equally split between the two compounds.

<sup>2)</sup> Xylene measurements were not available. The mixing ratio was assumed to be 50% toluene.



**Figure S1:** Measured initial (black) and predicted cloud-processed (colored) mass distributions of aerosol particles in six air masses as identified during SEAC<sup>4</sup>RS. Color-coding refers to the predicted absolute mass increase.



**Figure S2:** Measured initial (black) and predicted cloud-processed (colored) mass distributions of aerosol particles in six air masses as identified during SEAC<sup>4</sup>RS. Color-coding refers to the predicted O/C ratio.