Supplement of Geosci. Model Dev., 9, 2741–2754, 2016
http://www.geosci-model-dev.net/9/2741/2016/
doi:10.5194/gmd-9-2741-2016-supplement

Geoscientific Model Development
Open Access
EGU

Supplement of

Implementation of state-of-the-art ternary new-particle formation scheme to the regional chemical transport model PMCAMx-UF in Europe

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Supplementary Information

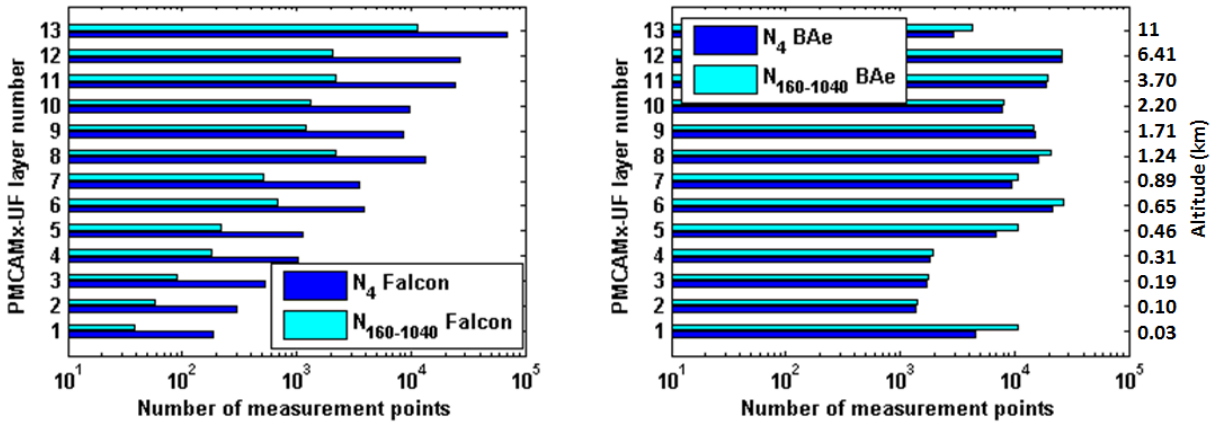

Figure S1. The availability of particle number concentration measurements as data point counts (x-axis) in the different model layers for particles larger than 4 nm (N_4) and particles with sizes between 160 and 1040 nm ($N_{160-1040}$) measured by the German DLR Falcon 20 (left panel) and the British FAAM BAe 146 (right panel) aircrafts. The corresponding altitude of the layer midpoint is shown on the right-hand side of the y-axis of the right panel. Note that similarly to N_4, the N_{10} has been measured by the same instrument onboard the Falcon 20 which results in the same data availability as N_4.

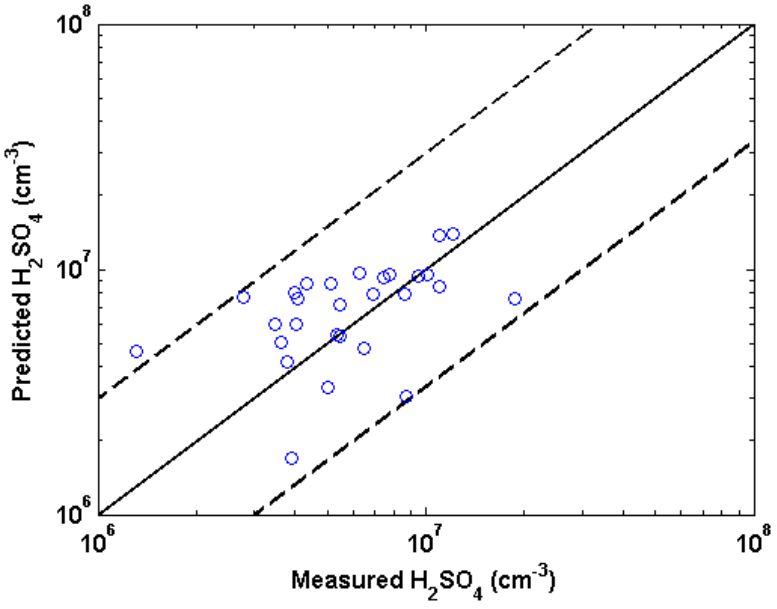

Figure S2. Comparison of PMCAMx-UF predictions vs. measurements of daily-averaged gas phase concentration (cm^{-3}) of sulfuric acid (H_2SO_4) during May 2008 for the site Melpitz, Germany. Lines corresponding to 1:1 (solid line), and 1:3 and 3:1 (dashed lines) are shown.

	Mean obs. (cm^{-3})	Mean pred. (cm^{-3})	Corr. coef.	NMB (%)	NME (%)
ACDC-TUV-DE					
N_{10}	5100	11500	0.35	126	145
N_{50}	2600	2160	0.69	-18	41
N_{100}	1100	620	0.69	-45	51
ACDC-RADM-DE					
N_{10}	5100	10770	0.37	111	133
N_{50}	2600	1990	0.70	-25	41
N_{100}	1100	570	0.69	-49	54
ACDC-TUV-NE					
N_{10}	5100	10860	0.41	113	131
N_{50}	2600	2400	0.64	-9	41
N_{100}	1100	610	0.70	-45	52
Napari-TUV-DE					
N_{10}	5100	5770	0.38	12	61
N_{50}	2600	2070	0.66	-21	43
N_{100}	1100	710	0.69	-35	45
Napari-RADM-DE					
N_{10}	5100	5180	0.42	1	57
N_{50}	2600	1950	0.66	-25	43
N_{100}	1100	670	0.69	-39	47

Table S1. Summary statistics of the model evaluation with observations from surface sites during the EUCAARI intensive observation period in May 2008. NMB and NME refer to normalized mean bias and normalized mean error, respectively. See Table 1 for the explanation of the simulations.

			N_4			N_{10}			$N_{160\text{-}1040}$		
			R	NMB (%)	NME (%)	R	NMB (%)	NME (%)	R	NMB (%)	NME (%)
Falcon	ACDC-TUV-DE	<2km	0.18	1005	1006	0.20	215	224	0.40	-80	80
		2-11 km	0.49	901	930	0.58	249	283	0.77	-74	81
	Napari-TUV-DE	<2km	0.00	16	103	0.12	-10	75	0.45	-73	74
		2-11 km	0.54	45	116	0.57	20	82	0.74	-47	75
	ACDC-TUV-NE	<2km	0.17	905	906	0.21	173	184	0.41	-77	77
		2-11 km	0.48	748	779	0.56	207	243	0.84	-66	74
BAe	ACDC-TUV-DE	<2km	0.08	935	939	-	-	-	0.25	-68	70
		2-6.4 km	-0.11	420	529	-	-	-	0.56	-54	78
	Napari-TUV-DE	<2km	0.02	16	90	-	-	-	0.24	-62	65
		2-6.4 km	-0.12	-28	120	-	-	-	0.53	-33	80
	ACDC-TUV-NE	<2km	0.16	808	812	-	-	-	0.27	-62	65
		2-6.4 km	-0.07	306	418	-	-	-	0.52	-44	78

Table S2. Summary statistics of the model evaluation with observations from surface sites during the EUCAARI intensive observation period in May 2008.