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Corrigendum to "A production-tagged aerosol module for Earth system models, OsloAero5.3 – extensions and updates for CAM5.3-Oslo" published in Geosci. Model Dev., 11, 3945–3982, 2018

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We have found an error in the calculation of observationbased organic matter (OM) mass concentrations. As a part of the study, we compared modeled OM concentrations with observed organic carbon (OC) concentrations scaled by an OM/OC conversion factor, which in the model calculations was assumed to be 1.4 for fossil fuel combustion and 2.6 for biomass burning, but with an unknown (not traced) value for the OC aerosol as a whole. The error made was that observed OC concentrations were divided instead of multiplied by 1.4, giving observation-based OM concentrations, OA, that were 1.96 times too small. After correcting this we obtain new validation results for OM surface mass concentrations as presented in Tables 5, 6, and 8 and Fig. 6. Only the statistics for OM concentrations are changed. Table 7 lists correlation coefficients for the different models. These are unaffected by the error and therefore not included here.

The corrected validation results are favorable for both CAM5.3-Oslo and its predecessor CAM4-Oslo as well as for the bulk of AeroCom Phase II (AP2) and AeroCom Phase III (AP3) models that were included for comparison. However, the main conclusions of the paper still hold.

Data availability. The original and corrected CAM4-Oslo and CAM5.3-Oslo data in Tables 5, 6, and 8 and Fig. 6 are available from the AeroCom database at http://aerocom.met.no (last access: 18 June 2020, see bit.ly/2YJveQk for plots as in Fig. 6), under the project label NorESM, Subsets NorESM-Ref2017 and NorESM-Ref2017-corrOM, respectively.

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Table 5. Seasonal and annual normalized mean biases (NMBs) and Pearson correlation coefficients (R) for NUDGE_PD vs. observed climatological surface concentrations (see http://aerocom.met.no, last access: 18 June 2020, cf. Fig. 6). NMB values with absolute values of 50 % or more are listed in bold font.

	BC		SO ₂		SO ₄		OM (OA)		SS		DUST	
	NMB	R	NMB	R	NMB	R	NMB	R	NMB	R	NMB	R
DJF	-53%	0.32	154%	0.45	-19%	0.66	-66%	0.31	20%	0.49	-8.4%	0.43
MAM	-21%	0.47	124%	0.23	19%	0.69	-17%	0.44	13%	0.57	-39%	0.82
JJA	8.2%	0.61	143%	0.21	46%	0.87	100%	0.37	28%	0.59	-52%	0.47
SON	-28%	0.38	180%	0.26	31%	0.70	-0.7%	0.25	26%	0.53	-42%	0.45
ANN	-28%	0.38	150%	0.35	22%	0.72	13%	0.29	22%	0.54	-39%	0.52

Table 6. Normalized mean bias (NMB, in %) statistics from 1 year of monthly data (see AeroCom web interface for details on coverage and networks). Compared are NMBs for the near-surface aerosol mass concentrations and column-integrated optical properties for CAM5.3-Oslo as well as for CAM4-Oslo and AeroCom models in the aerocom.met.no database (here represented by an NMB range). The top row indicates the meteorological year for observations and nudged simulations, where climatology means that all available years from the model or observations are used for the statistics. The regional coverage areas for observations are abbreviated as follows: E - Europe; N - North America; A – Asia; Global – nearly all continents or world oceans (island sites) are represented. The control version of the AeroCom Phase II (AP2) and Phase III (AP3) models used in the model intercomparison are listed below the table, with names as on the AeroCom web interface. Optics diagnostics listed for most of the AP2 and AP3 models (exact number is not available) are clear-sky values, in the sense that the clear-sky humidity of the grid cell is used for calculating hygroscopic swelling of the aerosol (Michael Schulz, personal communication, 6 September 2018). Supplementary information as provided by AeroCom modeling teams about optics diagnostics for 11 of the AP2 models included in this study may be found at https://wiki.met.no/aerocom/optical_properties (last access: 18 June 2020). CAM4-Oslo and CAM5.3-Oslo compute all-sky optical properties using the average humidity (RH) of the grid cell. Clear-sky (CS) properties are instead represented by a 2-D cloud-free fraction-weighted average of the all-sky properties. Only a few other AeroCom models follow a similar clear-sky optics definition, and the optics data submitted to AeroCom for a few of the models are all-sky values both in terms of cloud conditions and RH for hygroscopic growth. Data from CAM4-Oslo and the two simulations with CAM5.3-Oslo, all run with 2000 (PD) emissions, can be found in the aerocom.met.no database under the project label NorESM, Subset NorESM-Ref2017 for all components except OM and NorESM-Ref2017-corrOM for OM. NMB values with absolute values of 50 % or more are listed in bold font.

		Climatol	ogy		2006		2010		
NMB (%)	Coverage	CAM4- Oslo	CAM5.3-Oslo NUDGE_PD (AMIP_PD)	Coverage	AP2 range $(\leq 23 \text{ models}^*)$	CAM5.3-Oslo NUDGE_PD	Coverage	AP3 range $(\leq 8 \text{ models}^*)$	CAM5.3-Oslo NUDGE_PD
SO ₂ conc.	E; N; A	16	150 (137)	E; N	65–977	223	Е	NA	328
SO ₄ conc.	E; N; A	-5	22 (27)	E; N	-61-186	37	E	-40- 199	31
BC conc.	E	-54	-28 (-34)	Е	-40- 64	-32	E	-65 -35	-16
OA (OM) conc.	E; N	5.6	13 (14)	E; N	-79-120	22	E	-839	-35
Sea salt conc.	E; N; A	50	22 (40)	E; N	-97-477	66	E	-56-301	36
Dust conc.	Global	-14	-39 (-24)	Global	-64-106	-34	Global	-82-4	-46
OD550CS	Global	-22	-16 (-27)	Global	50 122	-18	Global	52 2	-24
OD550	Global	-8	15 (3)	Global	-30-133	11	Global	-555	12
ABS550CS	Global	-32	-25 (-30)	Global	80. 21	-38	Global	NIA	-36
ABS550	Global	-33	-20 (-30)	Global	-80-21	-30	Global	INA	-35
ANG4487CS	Global	NA	-17 (-15)	Global	20.21	-15	Global	NA	-16
ANG4487	Global	-19	-44 (-42)	Global	-30-31	-44	Global	NA	-45

* Excluding models with missing data or with NMB < -99 % or NMB > 1000 %. AP2 models: CAM5.1-MAM3-PNNL.A2.CTRL, ECHAM-SALSA.A2.CTRL, ECHAM-SALSA.A2.CTRL, emi2000, GISS-MATRIX.A2.CTRL, GISS-modelE.A2.CTRL, GLOMAPbin1pt1.A2.CTRL, GLOMAPmodev4.A2.CTRL, GLOMAPmodev6R.A2.CTRL, GMI.A2.CTRL, GMI-v3.A2.CTRL, GOCART-v4.A2.CTRL GOCART-v4Ed.A2.CTRL, HadGEM2-ES.A2.CTRL, HadGEM3-A-GLOMAPA2.CTRL, INCA.A2.CTRL, MPIHAM_V1_KZ.A2.CTRL, MPIHAM_V2_KZ.A2.CTRL, OsloCTM2-v2.A2.CTRL, OsloCTM2.A2.CTRL, SALSA_V1_TB.A2.CTRL, SPRINTARS-v384.A2.CTRL, SPRINTARS-v385.A2.CTRL, and TM5-V3.A2.CTRL, AP3 models: CNRM-CM6.2Nut127_AP3-CTRL2015, CNRM-CM6.21127_AP3-CTRL2015, ETHZ-ECHAM-HAM2_CTRL2015, GEOS-Chem-v10-01_AP3-CTRL2015, OsloCTM3_AP3-CTRL2015, SPRINTARS-T106_AP3-CTRL2015, SPRINTARS-T213_AP3-CTRL2015, and TM5_AP3-CTRL2015.

Table 8. Percentage of model near-surface concentration and column-integrated optical parameter values within a factor of 2 of the observations (Fact2, given in %) for the same data as in Table 6.

		Climatolog	y		2006		2010		
Fact2 (%)	Coverage	CAM4-Oslo	CAM5.3-Oslo NUDGE_PD (AMIP_PD)	Coverage	AP2 range $(\leq 23 \text{ models}^*)$	CAM5.3-Oslo NUDGE_PD	Coverage	AP3 range (≤ 8 models*)	CAM5.3-Oslo NUDGE_PD
SO ₂ conc.	E; N; A	36	12 (12)	E; N	4-33	10	Е	NA	7
SO ₄ conc.	E; N; A	68	57 (53)	E; N	17-85	45	E	14-70	39
BC conc.	E	68	75 (72)	Е	20-51	46	E	26-64	50
OA (OM) conc.	E; N	54	48 (45)	E; N	10-61	46	E	5-60	44
Sea salt conc.	E; N; A	34	31 (28)	E; N	0-37	31	Е	2-40	34
Dust conc.	Global	34	24 (18)	Global	9-32	18	Global	7–23	19
OD550CS	Global	75	42 (41)	Global	45-80	39	Global	38-74	49
OD550	Global	69	68 (71)	Global		64	Global		58
ABS550CS	Global	54	47 (51)	Global	10-51	45	Global	NA	40
ABS550	Global	53	50 (50)	Global		49	Global		48
ANG4487CS	Global	NA	83 (85)	Global	68–90	82	Global	NA	83
ANG4487	Global	81	49 (52)	Global		54	Global		51

* Excluding models with missing data or with NMB < -99 % or NMB > 1000 %.



Figure 6. Surface concentrations in the NUDGE_PD experiment compared with EBAS and AEROCE data through the AeroCom tools. OA represents modeled OM concentrations vs. observed OC concentrations multiplied by 1.4 (the assumed OM/OC ratio for fossil fuel OC in the model).