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MODEL FEEDBACK STUDY W.R.T. STATION OBSERVATIONS OF AEROSOL OPTICAL DEPTH (AOD)

AOD change [%] – global station m	ean for different experiments [$\Delta =$ (1-Exp/Ref)*100].
$Ref =$ reference in Δ with $Exp =$ g	lobal AQ model type (CAMS T255 or EMAC T106 / T42), or
Ref = obs, i.e., AERONET station	observations: approx. 60 km radius (light path) with 3 hourly mean.
AW = yes/no: refers to whether ae	rosol water explicitly considered in model physics and radiative forcing.
Free = yes/no: refers to external me	eteorological forcing. For EMAC: $yes = nudging$, $no = only SST$ forcing.
	is results are shown (CAMS REA) that are based on AOD data assimilation.
Res = horizontal model grid box res	olution. CAMS (T255): approximately 55 km (with an equidistant model grid).
EMAC (T255): 55 km, EMAC (T10	6): 110 km, EMAC (T42): 280 km – at the equator approx. (non equidistant).
EMAC Exp 1-4 simulation period: 1	June – 30 September 2013, AOD output + AERONET comparison daily mean.
CAMS and EMAC* simulation period	od: 1 – 30 June 2013, AOD output + AERONET comparison 4 hourly mean.
$EMAC^* = EMAC$ output regridded	to CAMS grid for AERONET station comparison and statistical analysis.

1	Location	Global/mixed	Global/mixed	Global/mixed	Global/mixed	Global/mixed	Global/mixed	
Summary	Ref	OBS – CAMS	OBS – EMAC*	CAMS – EMAC*	Exp1 – Exp2	Exp1 – Exp3	Exp1 – Exp4	
	Res	60 vs 55 km	60 vs 55 km	T255 vs T255	T42 vs T42	T42 vs T42	T42 vs T42	
	AW	yes – no	yes – yes	no – yes	yes – no	yes – yes	yes – no	
	Free	N/A – no	N/A – no	no – no	no – no	no – yes	no – yes	
I	Npoints	19237	19237	19237	22277	22277	22277	
l	Δ [%]	-8.75	16.63	23.34	19.26			Update \mathbb{N}
l	Europe	Urban/City	Urban/City	Urban/City	Rural/Co			
l	Exp	Exp1 – Exp2	Exp1 – Exp3	Exp1 – Exp4	Exp1 – E:			
I	Npoints	773	773	773	303			
l	Δ [%]	-31.57	30.59	9.47	-31.95			

eating the simulations in a

storage, we could not com

1AC superior for some dust locations.

TIONS

S AOD – CAMS REA issue? Dust aging issue?

MODIS (Aqua/Terra) and of PMAp v2.2.2, sol product of the Meterological Operational 1 (M01), MetOp-A platform number 2 (M02).

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EXP2 VS EXP1 AND EXP4 VS EXP3

Aerosol water effect on AOD noticable

EXP4 VS EXP1 RELATIVE TO EXP3 VS

Aerosol water effect on AOD larger for the Effect is evident for several AERONET

REMOTE VS URBAN REGIONS

Aerosol water effect on AOD larger for u This effect is most pronounced for the free running E

SNAP SHOT

EMAC sensitivity results are preliminary

TAKE HOME MESSAGE

Aerosols can effect AOD, even with unc

University of Freiburg