AeroCom

OBJECTIVES

The joint initiative ***AEROCOM*** aims to document and understand the differences in current multi-component aerosol modules of global models. Investigated in particular are consequences of differences in

- source strength and vertical transport or removal on mass fields

- water uptake, humidification and aerosol size on optical depth fields

- aerosol composition and radiative transfer simplifications on forcing

Model-activity: Invite modelers to participate in coordinated model simulations, with prescribed meteorological data and component sources for a particular time-period spanning at least one yearly cycle.

Data-activity: Coordinate from a synergy of measurements from ground and space the best possible data-sets for the years of the model-comparison exercise. Include uncertainty levels for all data.

Evaluation-activity: Based on all possible daily comparisons statistically evaluate (component) model simulations on consistency and evalute to data (also usually on a component and altitude integrated basis)

PLANNED MODEL EXPERIMENTS

Participants: Global (climate / transport) models with aerosol components

Components: dust, sea-salt, black carbon, org.matter, sulfate

Experiment A *:* Models as they are

Experiment B *:* Models with prescribed sources (+nudged) for year 2000

WEBSITE

http://nansen.ipsl.jussieu.fr/AEROCOM/

Request For Data

DAILY OUTPUT	each Species	total Aeroso	Remark	proposed unit
Daily (instantaneous, at local noon time, thus varying the time of output depending on longitude, column integrated values, though all values from all longitudes for one day stored in one record corresponding to 12UTC)			Daily local noon time data are chosen to facilitate the comparison with satellite observations while keeping the output routines simple	
o dry mass for each species	X		column sum	[kg/m2]
o dry mass for radii below 0.50um for each species	X		column sum	[kg/m2]
o dry mass for radii above 1.25um for each species	X		column sum	[kg/m2]
o aerosol water mass		X	column sum	[kg/m2]
o effective dry radius		X	3 * (Sum of Aerosol Volume per column) / (Sum of Aerosol Surface Area per column)	[µm]
o effective dry radius for radii below 0.50um		X	see above	[µm]
o effective dry radius for radii above 0.50um		X	see above	[µm]
Precision: MODELS WHICH COMPUTE OPTICAL PROPERTIES JUST IN CLOUDFREE AREA PROVIDE THOSE VALUES				
o optical depth (at 550 nm wavelength) for each species	X		based on wet radius	[]
o optical depth (at 865 nm wavelength) for each species	X		based on wet radius	[]
o optical depth at 550 nm for each species fine mode	X		wet radius <1 um / 2001 only / Modis parameter	[]
o optical depth at 550 nm for each species coarse mode	X		wet radius >1 um / 2001 only / Modis parameter	[]
o absorption at 550 nm		X	sum of aerosol absorption at 550 nm	[]
o cloud cover fraction			column integrated value of cloud cover, computed as used in radiation code of respective model	[%]
o relative humidity			average achieved by weighting with optical depth at 550 nm from each level; all sky relative humidity computed first at each level RH= f(ave(T),ave(q)). Weighting from l levels: Sum(RH$_l$*OD$_l$)/Sum(OD$_l$)	[%]
o pressure			average achieved by weighting with optical depth at 550 nm from each level. Weighting from l levels: Sum(P$_l$*OD$_l$)/Sum(OD$_l$)	
Daily (instantaneous everywhere at UTC 12:00)				
o optical depth at 550 nm wavelength for each species	X			[]
Daily (daily average from 0 UTC to 24 UTC)				
o optical depth at 550 nm wavelength for each species	X			[]

DAY

Request For Data

MONTH

MONTHLY OUTPUT	each Specie	total	Remark	proposed unit
Monthly (sum over all time steps)				
o column wet deposition for each species	X		sum over month	[kg/m2/month]
o surface turbulent dry deposition for each species	X		sum over month, without sedementation	[kg/m2/month]
o surface sedimentation for each species	X		sum over month	[kg/m2/month]
o source flux for each species	X		surface emissions and possibly production at altitude integrated to 2D field; sum over month / for SEA SALT flux is given just for particles below 20 um at 80 r.H.	[kg/m2/month]
Monthly (mean from all time steps, vertical resolved, except surface pressure)				
o dry mass loading for each species	X		3D mean of any grid box in month	[kg/m2]
o number loading for each species	X		since modal schemes output rather this info and with regard to indirect effect	[#/m2]
o dry mass fraction below 0.50um for each species	X		dry radii	[kg/m2]
o dry mass fraction above 1.25um for each species	X		dry radii	[kg/m2]
o aerosol water mass				[kg/m2]
o effective dry radius		X	see DAILY OUTPUT for definition	[µm]
o effective radius for dry radii below 0.50um		X	see DAILY OUTPUT for definition	[µm]
o effective radius for dry radii above 0.50um		X	see DAILY OUTPUT for definition	[µm]
o temperature			3D field	[K]
o surface pressure			-- 2D field --	[hPa]
o relative humidity			3D field all sky relative humidity; RH=	[%]
o precipitation rate			3D field	[mm/day]
Monthly (mean fraction from all time steps, vertical resolved for relative humidity)				
o time fraction with relative humidity between 30-70% r.h.			3D field	[%]
o time fraction with relative humidity between 70-85% r.h.			3D field	[%]
o time fraction with relative humidity between 85-95% r.h.			3D field	[%]
o time fraction with relative humidity between 95-100% r.h.			3D field	[%]
o time fraction with wind speed >5 m/s (at 10 m height)			2D field	[%]
o time fraction with wind speed >8 m/s (at 10 m height)			2D field	[%]
o time fraction with wind speed >10 m/s (at 10 m height)			2D field	[%]
Monthly (mean for cloudfree fraction, data taken at local noon, use cloud cover fraction in each grid box as defined by radiation code to mask data, see also DAILY OUTPUT, vertical resolved)			use LOCAL NOON time below !!	
o cloudfree fraction in month			3D field as used in models radiation code	[%]
o optical depth at 550nm for each species in cloudfree area	X		3D field	[]
o absorption at 550nm for each species in cloudfree area	X		3D field	[]