

What is the current skill for aerosol in global models and for aerosol retrievals of satellites? Simulations of the aerosol climatic impact in global models have many degrees of freedom. An intermediate product, here the attenuation of sunlight by aerosol (the aerosol optical depth) is compared to demonstrate skill. For a complete yearly cycle, monthly aerosol optical depth averages of 6 models (all models distinguish among five different aerosol types) are compared to 5 satellite retrievals and to 1 ground -based aerosol data-set.

Monthly averages of aerosol properties

global fields for aerosol optical depth [model vs. measurements]

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Resolution	Simulation	Authors							
3.8/3.8deg	50yr avg	Feichter/ Lohmann / Schulz							
5.0/5.0deg	1yr avg	Herzog / Penner							
1.9/1.8deg	(95-00)	Collins / Rasch							
2.0/2.5deg	(90, 96, 97)	Chin / Ginoux							
2.8/2.8deg	(90)	Takemura / Nakajima							
4.0/5.0deg	3yr avg	Koch / Tegen							
[separate processing of sulfate, organic carbon, black carbon, dust, sea-salt]									
	Resolution 3.8/3.8deg 5.0/5.0deg 1.9/1.8deg 2.0/2.5deg 2.8/2.8deg 4.0/5.0deg sulfate, organic of	Resolution Simulation 3.8/3.8deg 50yr avg 5.0/5.0deg 1yr avg 1.9/1.8deg (95-00) 2.0/2.5deg (90, 96, 97) 2.8/2.8deg (90) 4.0/5.0deg 3yr avg							

Simulations

Satellites/Ground	Method	Data-Period	Region	Authors
 Mo- MODIS (.55μm) 	VIS/n-IR refl.	(2001)	global	Chu / Kaufman
 A,n - AVHRR (.63μm) 	VIS reflect.	(1985-1988)	ocean	Stowe (PATMOS)
 A,g - AVHRR (.55μm) 	VIS/n-IR refl.	(1984-2001)	ocean	Mishchenko / Geo
 • To - TOMS (.55 μm) 	UV-reflect.	(1979-2001)	global	Torres
+ Po - POLDER (.87μm)	pol n-IR refl.	(1986-1987)	global	Goulomb/Tanre
 Aer - Aeronet (.55μm) 	attenuation	(1998-2001)	no (sites)	Holben/Tanre
Idata other than at .55µm v	vere normalized	with Anastrom	narameters	of the CCSR-model

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- are optical depths a meaningful model evaluation tool? (correct type contributions, sources, transport, meteorology?)

Models



- examine models on a component basis - compare intermediate results (e.g. mass) - apply sampling for comparisons to data

Data Sets