AEROSOL DATA FROM SPACE

What dataset to choose?

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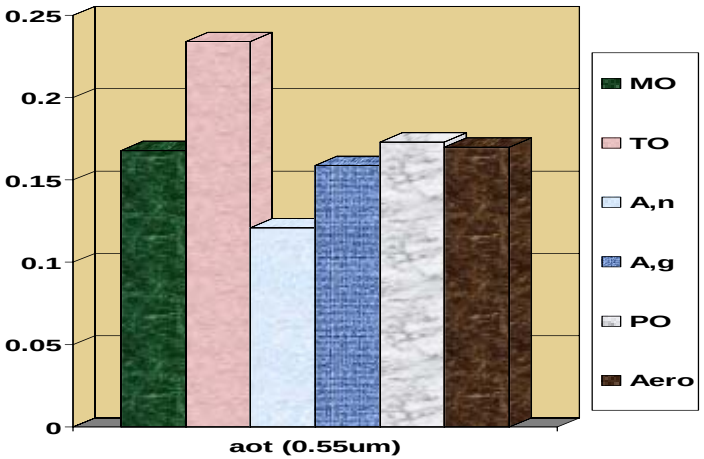
Satellite DATA

sensor	method	simulation	authors
MODIS	(.44/.67/1.6/2.2μm) refl	(2001)	Chu /Remer /Kaufman /Tanre
AVHRR	(.63/.83μm) refl.	(1984-2001)	Geogdzhayev /Mishchenko
	(.63μm) reflectance	(1979-1991)	Stowe
TOMS	(.34/.38μm) refl. diff	(1979-2000)	Torres /Herman
POLDER	(.67/.87μm) pol./refl.	(11/96-6/97)	Tanre /Goulomb

- All data-sets are 'normalized to .55μm wavelength
- Resolution of all data-sets is degraded to 1^0*1^0 horizontal resolution

- Concerns
  - MODIS: model, aerosol shape, limited land-coverage
  - AVHRR: model, ocean-limited, calibration, clouds
  - TOMS: model, height, cloud-contamination (50km pixel size)
  - POLDER: model, aerosol shape, larger sizes, clouds, no entire year

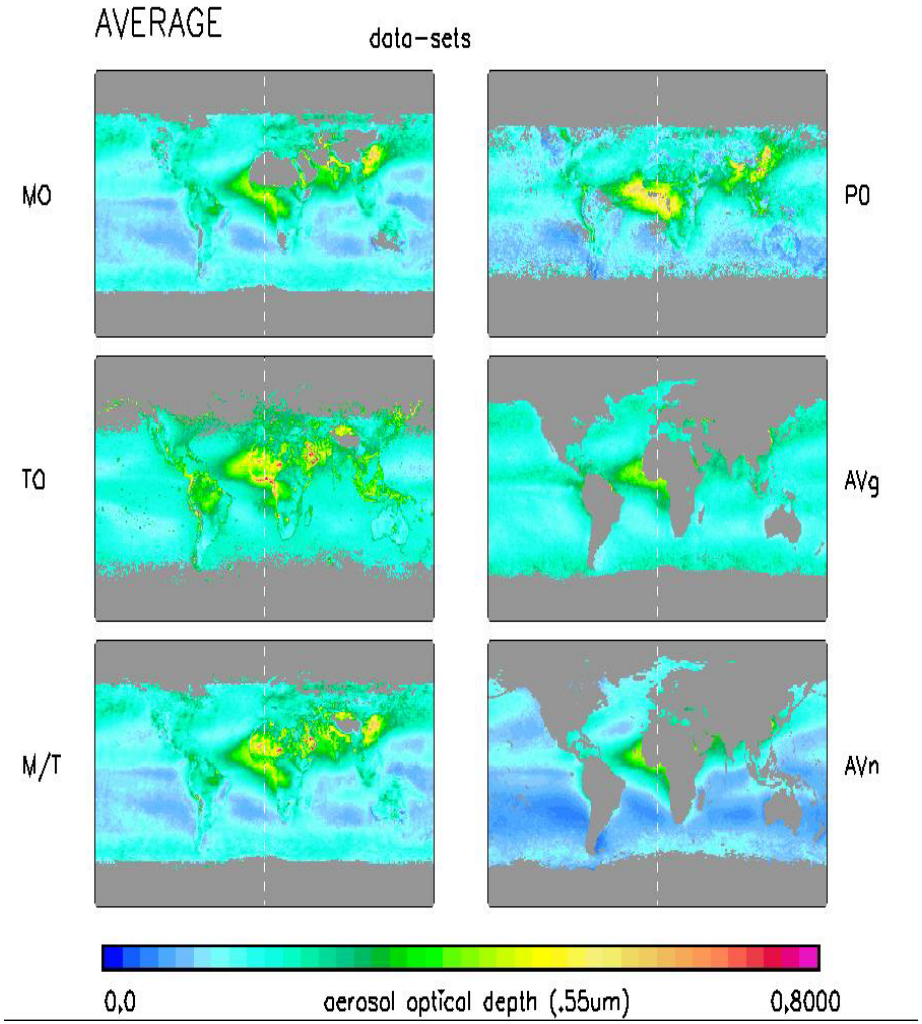
aot ‘space’ data



- ***aerosol optical depth from satellite data:***
  - **MO – MODIS, 01**
  - **TO – TOMS, 79-00**
  - **PO – POLDER, 96-97**
  - **AVg – AVHRR, 85-88**
  - **AVn – AVHRR, 85-88**

  (yearly averages, 0.55μm)

- ***a ‘best’ data-set?***
  - **supplement MODIS with TOMS (M/T)**

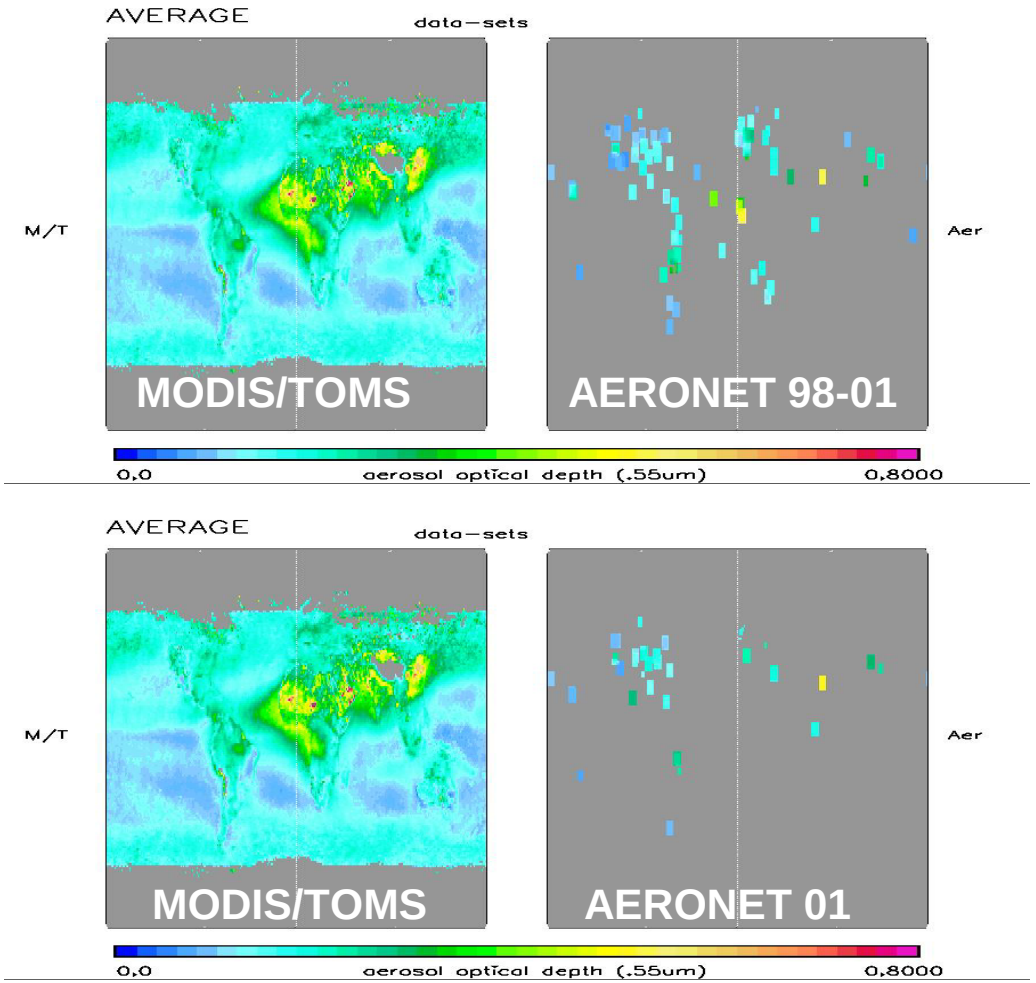


‘ground’ vs ‘space’

for yearly average aerosol optical depth < aot > :

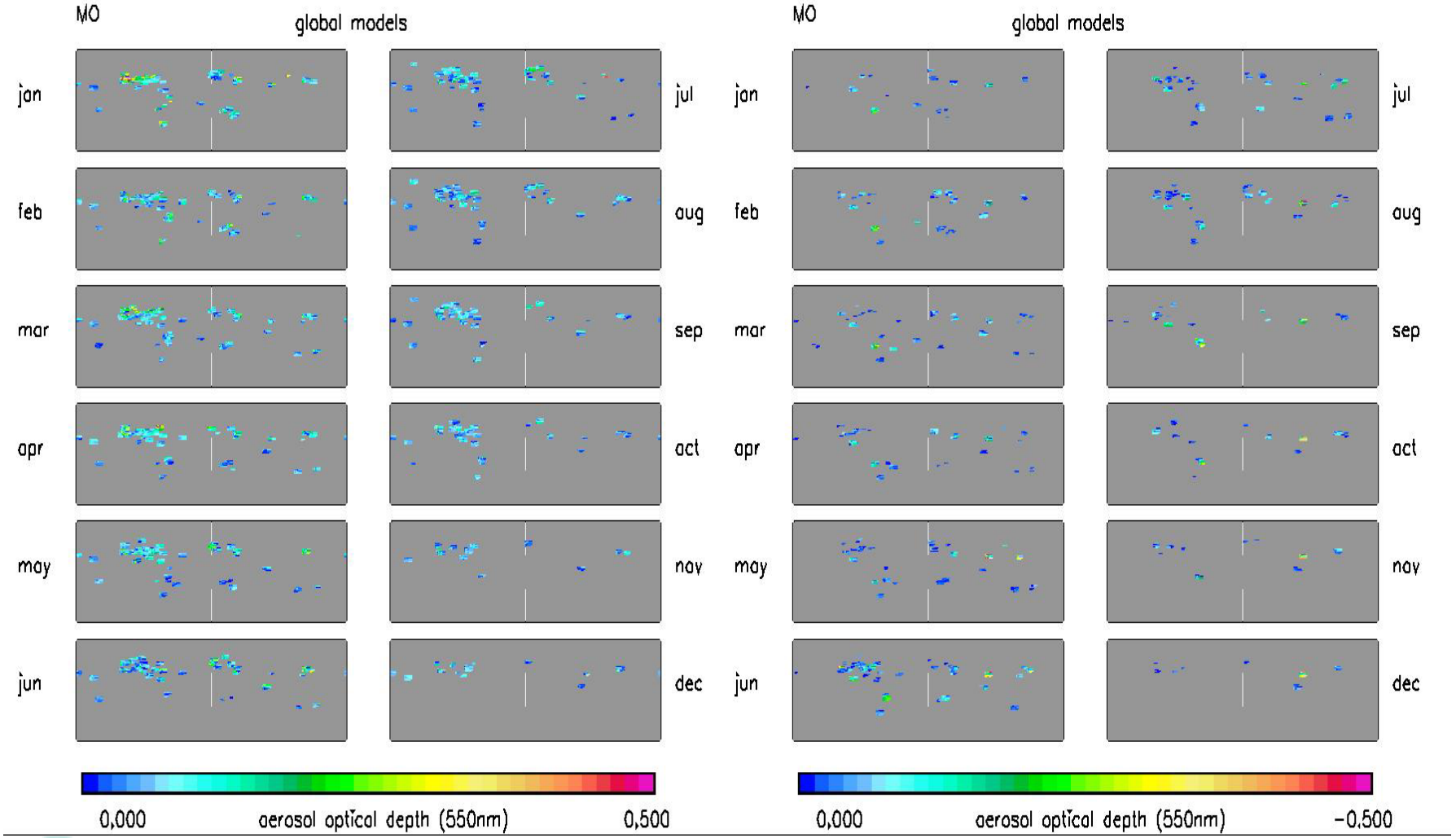
- ***Similar pattern***
- ***Satellite data are a bit larger*** ***(mainly due to snow contamination in winter)***

regional corr. factors were applied to AERONET data



over-estimates vs under-estimates

of MODIS with respect to AERONET



summary

- *combine data-sets!*
  - do we get closure or smooth transitions?
- *for global aot data from space*
  - MODIS with support from TOMS is currently the best
  - MODIS / MISR combination should be future basis
    - ➲ MISR can detect aerosol over deserts
    - ➲ MODIS and MISR are on the same orbiter
- *tests with quality ground-data are essential*
  - AERONET did reveals MODIS snow bias!