24-year AVHRR-derived climatology of aerosol optical thickness and size

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http://gacp.giss.nasa.gov
Analyses of AVHRR data

1. Two spectral channels (0.63 and 0.83 micrometers).
2. One viewing angle per pixel.
3. All model parameters are fixed except the total (column) aerosol optical thickness and the Angstrom parameter.
5. State-of-the-art radiative transfer model.
6. The longest available satellite record.
Global long-term GACP record

OPTICAL THICKNESS

YEAR

ÅNGSTRÖM EXPONENT

YEAR

El Chichon
Mt. Pinatubo

Global
Southern Hemisphere
Northern Hemisphere
The measurements cover the period from 10/16/04 to 12/6/04
(Smirnov et al. 2005; Session A22B, today 10:50 am)
Validation vs ship-borne sunphotometer data
Comparison with MODIS and MISR

![Graphs showing comparison between AVHRR, MODIS AQUA, MODIS TERRA, and MISR for optical thickness and Ångström exponent over years 2000 to 2006.](image-url)
Comparison with MODIS

\[ \tau(0.55\mu m) \text{ over ocean} \]

- AVHRR
- TERRA
- AQUA
- TERRA - AQUA

Global
Comparison with MODIS

AVHRR AEROSOL OPTICAL THICKNESS at $\lambda = 0.55 \, \mu m$, May 2003

AOT MODIS/TERRA, May 2003
Comparison with MODIS, MISR, and POLDER