OMPS LP Status Report

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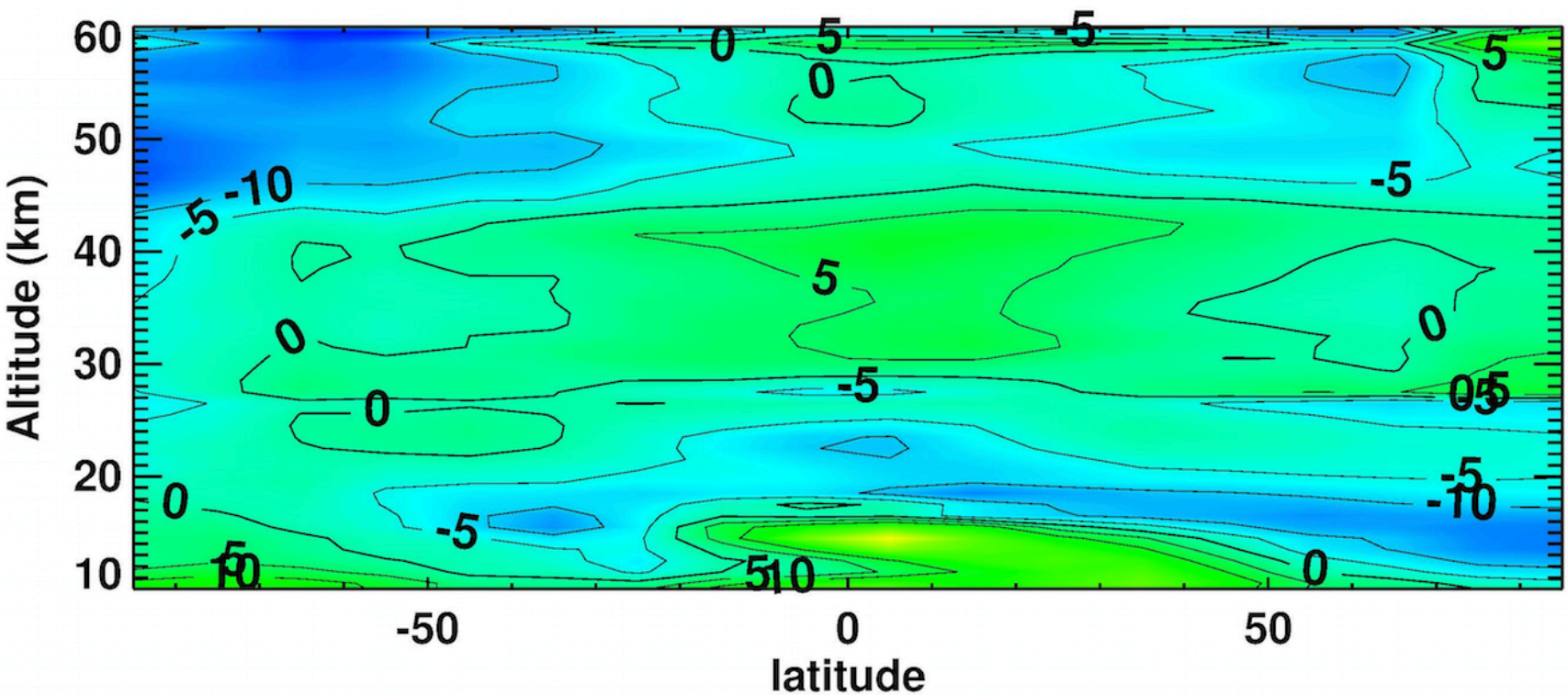
O_3 Product Status

- V2 data released in summer 2014.
  - No plans to reprocess the data this year
- Working on a validation paper that will describe known errors in the data listed below.
  - TH error (±150 m for the central slit, larger for other slits), no significant time dependence.
  - Aerosol errors (<+5% 20 km, up to -15% below). Errors may be larger immediately after Kelut eruption, but otherwise not much time dependence.
  - UV/VIS bias in northern polar region.

LP/MLS Bias (%) in V2



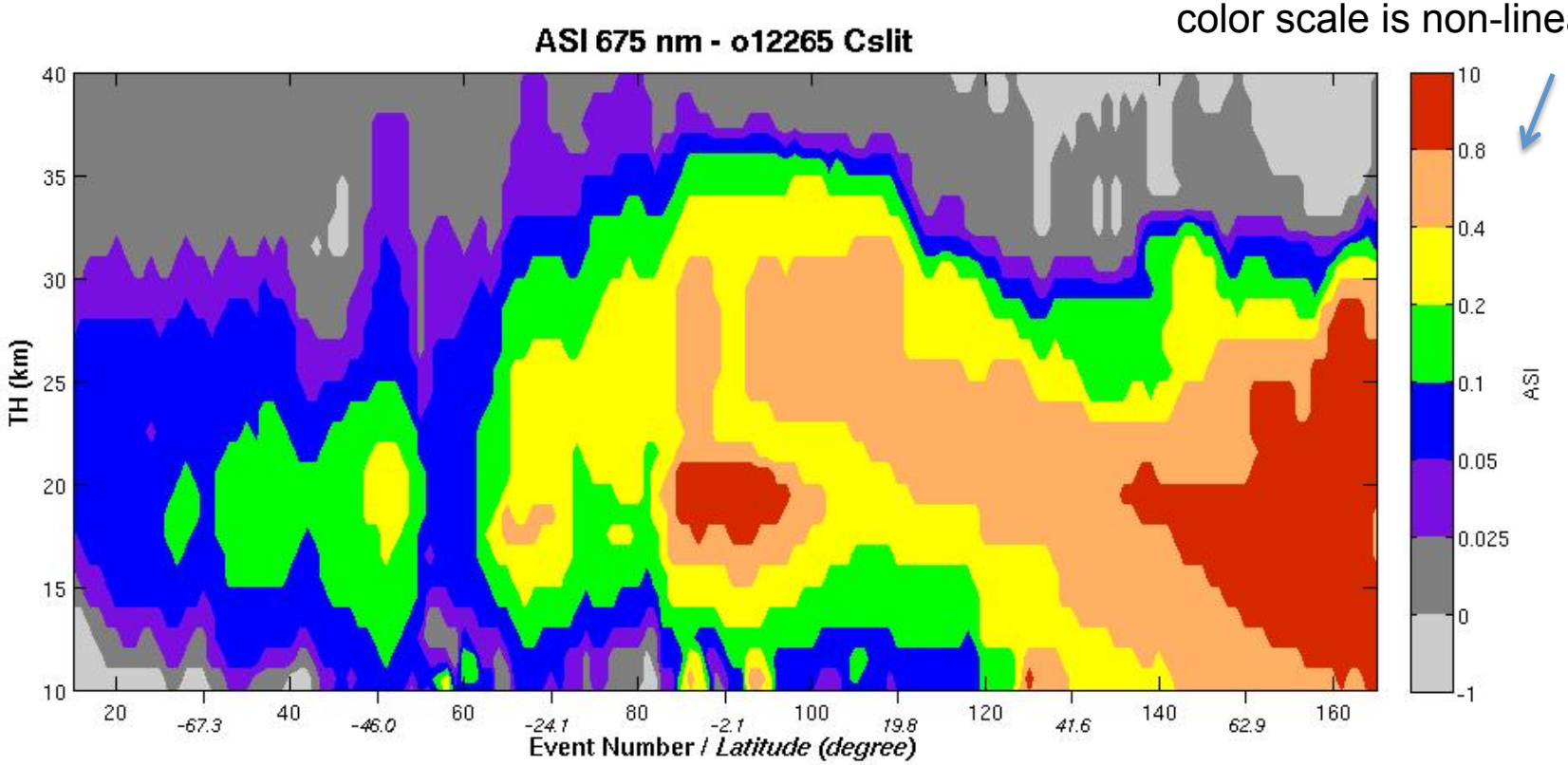
Mesospheric bias is not understood, but latitude dependence is caused by TH error. 5% bias at 35 km in the tropics and up to -15% bias in the lower stratosphere are due to aerosols.

New Products

- Cloud height dataset
  - Will be described by Zhong Chen
- Reflectivity and Aerosol Scattering Index (ASI) at 6 wavelengths (350- 1000 nm)
  - Reflectivity will be checked for internal consistency and compared with nadir instrument data.
  - Taha will compare with ASI calculated from Colarco/ Aquila model.
- Aerosol extinction profile derived from 675 nm ASI only.
  - Based on Chahine's non-linear relaxation method

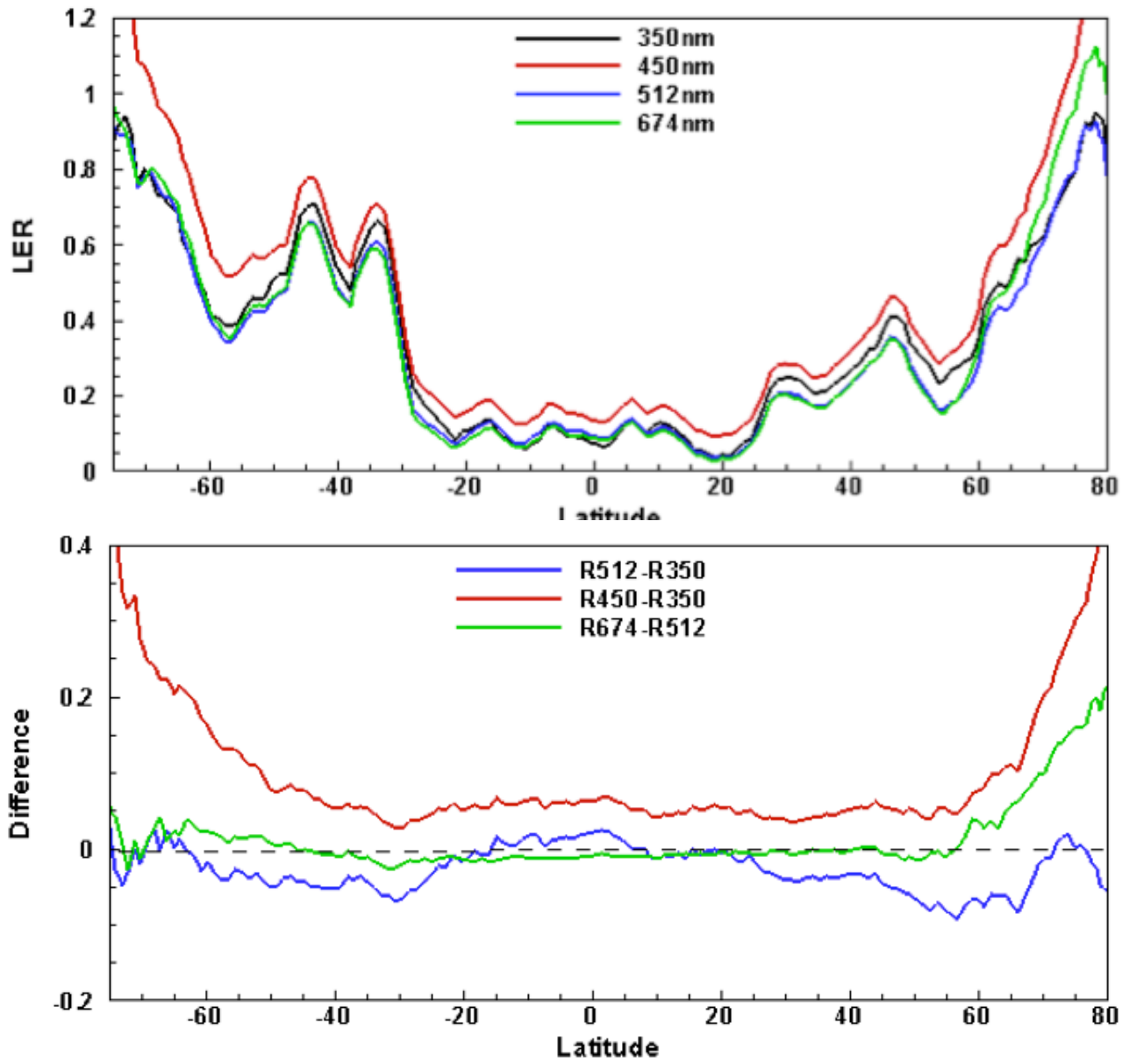
675 nm $ASI=(I_m-I_R)/I_R$

color scale is non-linear



I_R is calculated using GMAO-provided P/T profiles, assuming a purely Rayleigh atmosphere bounded by a Lambertian reflecting surface at the sea level. Reflectivity of this surface (LER) is calculated from 45.5 km radiances.

Reflectivity (LER) over Pacific

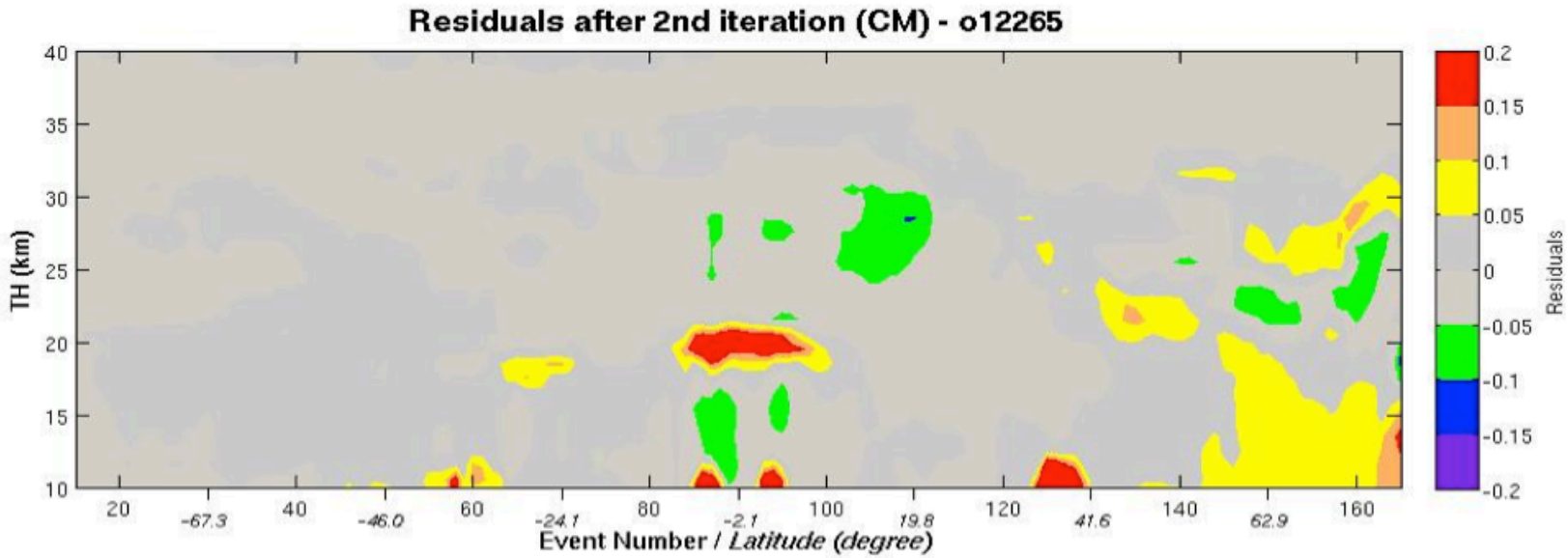


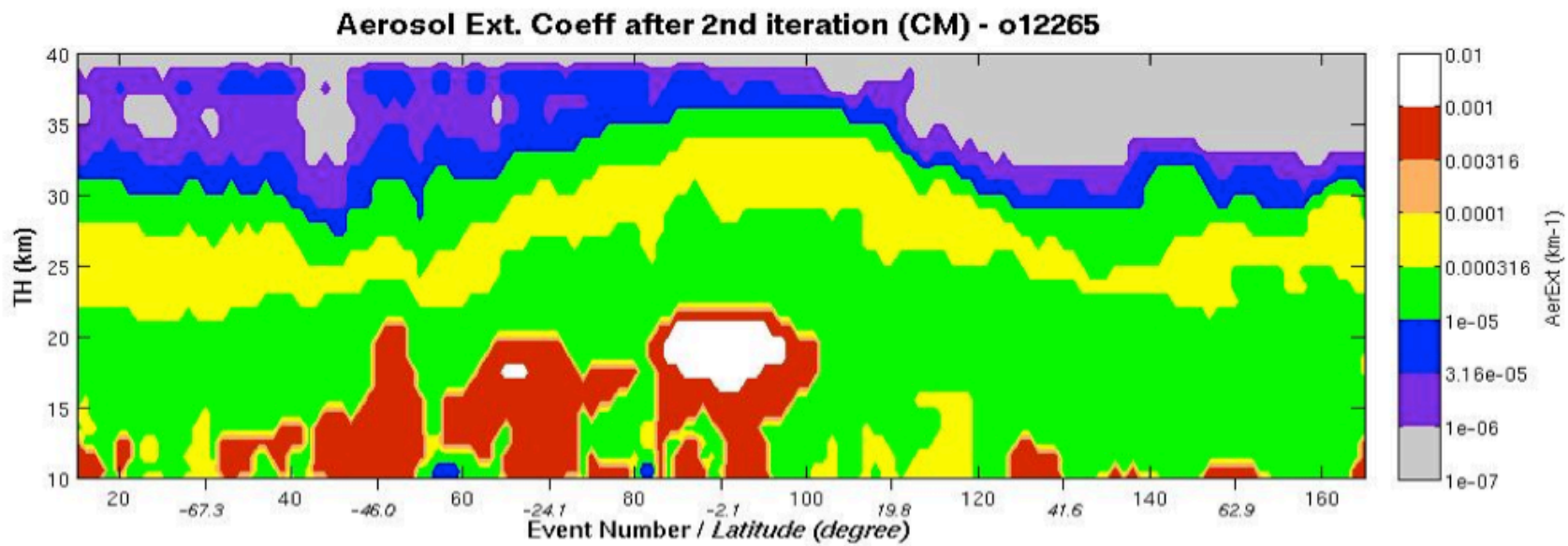
Chahine's Non-linear Relaxation Method

$$x_i^{n+1} = x_i^n \frac{y_i^{\mathrm{m}}}{y_i^n} \qquad i = 1 \ldots nz, n = 1, 2 \ldots.$$

x_i is the aerosol extinction and y_i is the ASI at the ith altitude level, n is the iteration number, and m refers to measured.

Results after 2 iterations





A New Wrinkle- Meteoritic Smoke

GRL 2011

Implications of extinction due to meteoritic smoke in the upper stratosphere

Ryan R. Neely III,[1,2,3] Jason M. English,[1,4] Owen B. Toon,[1,4] Susan Solomon,[1] Michael Mills,[5] and Jeffery P. Thayer[6]

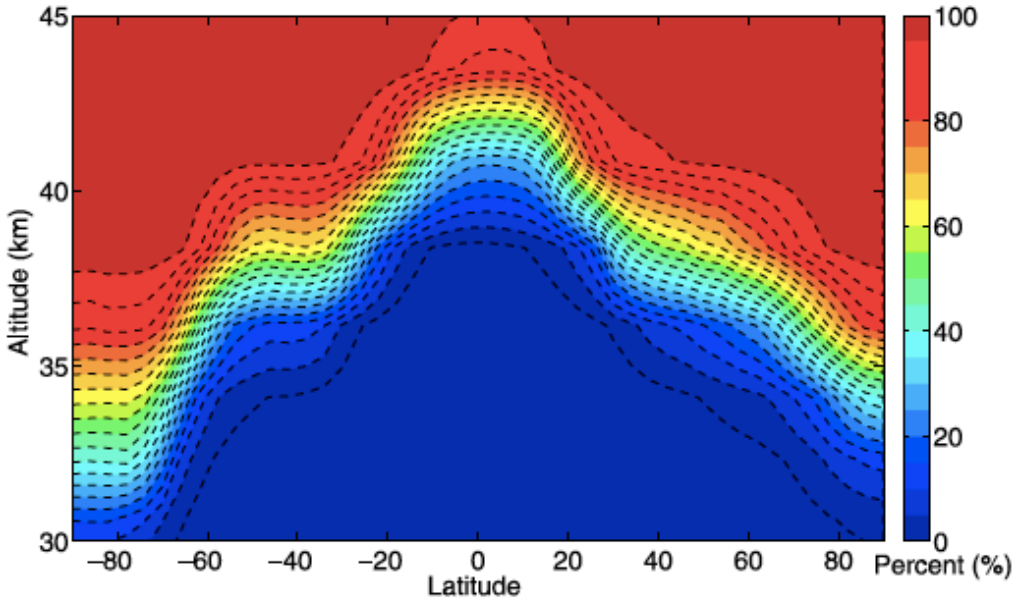


Figure 3. Percentage of modeled zonal average total aerosol extinction at 532 nm due to meteoritic smoke alone. This was calculated by taking the ratio of the extinction caused by meteoritic smoke particles alone to the total amount of extinction from all aerosols (meteoritic smoke plus mixed and pure sulfates) included in the model. Average comes from 10 years of model run time.

Why do we care?

- Sulfate particles generated by Meteoritic Smoke (MS) are much smaller than OCS generated sulfates
  - changes the scattering phase function
- MS contains hematite which has strong absorption in the UV & blue
  - Changes the spectral dependence of radiances
- If SAGE-measured extinctions near 45 km are correct then MS should significantly affect LP radiances at 45 km
  - We have to revisit our stray light assumptions