Early observation of the Venus cloud upper haze

• O'leary et al., 1975—Mariner10
  - Mariner10 found out about upper haze layer.
• Travis et al., 1979—Pioneer Venus polarization observation
  - Refractive index: 1.44, particle size: 0.4 µm
• Kawabata et al., 1980—Pioneer Venus polarization observation (UV)
  - Refractive index: 1.45±0.04(=sulfuric acid), particle size: 0.23 µm,
    optical thickness: polar region 1 equatorial region: 0.2
• Mukai et al., 1981—Comparison of observation and calculation
  - Haze is not sulfuric acid?
• Crisp., 1986—Comparison of observation and calculation (UV)
  - Optical thickness: 1-12
• Pollack et al., 1993—updated Crisp. (1986)
  - Optical thickness: 10

Recent observation of the Venus cloud upper haze

• Wilquet et al., 2009/2012
  - Venus Express
    Solar Occultation at InfraRed (SOIR)
  - Upper haze: vertical and latitude distribution of extinction, particle size

Venus Express
Solar Occultation at InfraRed (SOIR)

• SOIR
  - wavelength: 2.3-4.2 µm
  - wavelength resolution: 0.06 nm
• Solar occultation
• Transmittance (T) at 60-220 km is observed continually.

SOIR Data

Data analysis

\[ k_i = \frac{\tau_i}{L_i} \]

Normalized Extinction (mixing ratio) = k / total density

Integration
• Haze exist at above 90 km at both high and low latitude.
• Curve structure at around 90 km at both high and low latitude
• Low latitude evening: thick

High lat. morning
High lat. evening
Low lat. morning
Low lat. evening

• Similar with SO2 latitude distribution [Marcq et al., 2011]
  • haze and sulfide are related chemically.