

Identification of PSCs from solar infrared transmission spectra.
by Helen Steele, Annmarie Eldering, Bhaswar Sen, Geoff Toon, Bill Irion

During the 1987 Airborne Antarctic Ozone Expedition (AAOE) the Mark IV interferometer flew aboard the DC-8 aircraft, recording the transmission of solar radiation in the infrared between 600 and 5900 cm^{-1} . In earlier work investigators identified a set of window regions within these spectra in which PSC models were fitted to the transmission data. In new work presented here, the spectral data have been analyzed to determine the abundance of absorbing gases along the slant path. After accounting for the gaseous contribution, the residual attenuation of the sunlight is attributed to absorption and scattering by stratospheric aerosols. Thus the continuum spectrum for aerosols over the entire Mark IV wavenumber range is obtained. Using recent laboratory measurements of the temperature- and composition-dependent refractive indices of ternary solutions of sulfuric acid, nitric acid and water in the infrared, we fit aerosol models to extensive regions of the continua spectra to distinguish between ice and ternary solution PSCs and determine slant column aerosol loading. In particular we focus on strong differences in the spectra between 900 and 1100 cm^{-1} to determine particle size and composition.