conditions) the model production rate is 1 x 10^{-14} g cm^2 sec^{-1}. C_2H_6 is the dominant haze component (75%), with the remainder coming from C_2H_2 and C_3 and C_4 compounds. Balancing our haze production rate by the sedimentation rate for 0.25 µm radius particles (upper size limit from PPS observations) yields a total haze column burden 24% above the PPS upper limit. However lifetime analysis indicates that the model haze production rate should be averaged over solar minimum and maximum conditions. Under these conditions the model haze density is consistent with the PPS data. The predicted C_4H_2 and C_2H_6 haze densities are consistent with the lack of ice signatures in the IRIS spectra.

18.17-P

The Origin of Carbon Monoxide in Neptune's Atmosphere

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Marten et al (1991, 1993) and Rosenqvist et al (1992) detected about 1 ppm of CO in Neptune's atmosphere. Here we show that CO on Neptune is plausibly explained by rapid vertical mixing from its deep atmosphere. Our results require that Neptune has large enrichments of heavy elements ($Z \geq 3$) over solar composition. CO is produced from CH_4 via the net thermochemical reaction $CH_4 + H_2O = CO + 3H_2$. The CO mixing ratio (X_{CO}) is given by $K_{eq}(X_{CH4}X_{H2O}/X^3_{H2})\Phi(1/P^2_T)$ where K_{eq} is the equilibrium constant for the reaction, X_i is the mixing ratio of i, Φ is the fugacity coefficient quotient, and P_T is the total pressure (Fegley et al 1992 in *Uranus*, ed. Bergstralh et al). Using observed mixing ratios and upper limits for Uranus and Neptune, the ratio of the CO mixing ratios on the two planets is $X_N/X_U = (X_{H2O})_N/(X_{H2O})_U$ to a first approximation since the quench temperatures (and hence the equilibrium constants), the CH_4 mixing ratios, the H_2 mixing ratios, the fugacity coefficient quotient, and the total pressure at the quench level are almost the same on Uranus and Neptune. The data of Rosenqvist et al show that the ratio $X_N/X_U \geq 16$ because there is only an upper limit for CO on Uranus. Assuming a ratio of 16 and that water and methane are equally enriched on Uranus, the observed methane enrichment factors of 17-42 times solar on Uranus (Fegley et al 1992) imply a water enrichment factor on Neptune of about 272-672 times the solar value ($H_2O/H_2 \sim 1.56 \times 10^{-3}$). Thus, the observed CO on Neptune can be supplied by rapid vertical mixing ($K_{eddy} \sim 10^7$-10^9 cm^2s^{-1}) from the deep atmosphere of Neptune if it is water-rich. The amount of water is reduced if more CH_4 is present on Neptune than on Uranus because X_{CO} scales as E^2 where E is the heavy element enrichment over solar. The amount of water on Neptune is also reduced if water is already enriched more than methane on Uranus. This is plausible if most of the carbon on Uranus was originally accreted as volatile ices, because water ice is more refractory than either CH_4 or CO ices (or clathrates). Our model is testable by observations of the water abundance in the deep atmosphere of Neptune, the CH_4 abundance in the deep atmosphere, and by the vertical profile of CO in Neptune's atmosphere. **Acknowledgments.** Supported by the NASA Planetary Atmospheres Program.

18.18-P

Study of Transmitted Light Through Neptune's Atmosphere

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The first step in photochemical modelling is the study of the transmission of solar flux through the atmosphere. Instead of using a classical radiative transfer program, we developed a Monte-Carlo code which is more applicable to the Mie scattering modelling. The physical effects we have taken into account are Rayleigh and Mie scattering and absorption by atmospheric gases and aerosols. The composition and the profil temperature are derive from Lindal (1992) and the distribution of aerosols from Baines and Smith (1990).
The results are presented in terms of solar flux variations in the atmosphere as a function of altitude and zenithal angle of incident photons. Finally, in order to compare our model with observations, the albedo of Neptune is presented.

18.19-P

Effects of the Centimeter Wavelength Opacity of H_2S on Propagation and Emission in the Atmospheres of the Outer Planets[1]

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Recently, measurements of the microwave properties of H_2S have been taken under simulated conditions for the outer planets (DeBoer and Steffes, 1993, Laboratory Research for Planetary Atmospheres Conference). This is especially significant for Uranus and Neptune since they appear to be depleted in NH_3 and thus H_2S may significantly affect the emission from those planets (de Pater et al., 1991, Icarus 91:220). These measurements show values that are significantly greater than values predicted by Van Vleck-Weisskopf models, even using the new value for the H_2S line broadening parameter developed by Joiner et al. (1992, IEEE Trans. MTT, 40:1101). In addition to the strong opacity (relative to the Van Vleck-Weisskopf line shape function) the hyper-refractivity of the H_2S molecule (8.85 x 10^{17} N-units/molecule/cm^3—8 times greater than that of nitrogen) has consequences for the interpretation of observational data. Radiative transfer models which utilize these results are being developed for Uranus and Neptune. The most recent radiative transfer models will be presented and the conclusions to date will be summarized.

18.20-T

H3+ distribution on Uranus

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L window studies of Uranus show that although the planet is essentially invisible when broadband imaging is attempted, c.v.f images taken at wavelengths sensitive to the H3+ molecular ion are able to discriminate against the sky's thermal background. The images were obtained on April 22 and April 23, 1993 (U.T.) using the ProtoCAM infrared camera on the NASA Infrared Telescope Facility on Mauna Kea, Hawaii.

The new images show that H3+ is widely distributed across the uranian disk. The total power output is comparable with that obtained in 1992 by Trafton et al, and shows little variation between the two nights. The images are smeared due to seeing and tracking (about 0.75") and the rotation of the planet (between 20 and 30 degrees). However, they show up some structure.