M138-023 **Room: 201B** **Time: May 21 11:45-12:00**

Development of a new radiative transfer model for the Venus atmosphere

Masahiro Takagi[1]; Kodai Suzuki[2]; Hideo Sagawa[3]; Philippe Baron[4]; Yoshihisa Matsuda[5]; YASUKO KASAI[4]; Takamasa Seta[4]

[1] Dept. of Earth and Planetary Science, Univ. of Tokyo; [2] Science Education, Tokyo Gakugei Univ.; [3] MPS; [4] NICT; [5] Dept. of Astronomy and Earth Sci., Tokyo Gakugei Univ.

Observations show that temperature decreases with altitude nearly at the dry adiabatic lapse rate in the lower Venus atmosphere. It has been explained that this temperature distribution is formed from an (unstable) radiative-convective equilibrium state by the atmospheric general circulation (mean meridional circulation). However, it was pointed out recently that the lower Venus temperature distribution might be formed only by the radiative transfer. In the present study, we would like to construct a new radiative transfer model based on the latest spectroscopic data to calculate the radiative-convective equilibrium temperature profiles in the Venus atmosphere correctly. It has been pointed out by Hollingsworth et al. (2007) that the radiative process is of importance for the generation of the atmospheric superrotation. The present study is essential for further investigations on the Venus atmospheric dynamics.

The radiative transfer model constructed in the present study is based on the correlated k-distribution method. The k-distributions of CO2 and H2O are calculated from the HITEMP spectroscopic database. In this calculations, the Lorentzian line profile and that introduced by Pollack et al. (1983) are taken into account. The collision induced CO2 continuum is based on the work of Moskalenko et al. (1979). In the following calculations, diurnal variation of the solar flux is not taken into account.

In the cases of the line profile given by Pollack et al. (1983), it is shown that the bottom temperature is less than 550 K, which is considerably less than the observed bottom temperature (730 K). Effects of the CO2 continuum and the H2O vapor absorption on the bottom temperature are 130 K and 100 K, respectively. The effect of the H2SO4 cloud (40-70 km) is not so large except in the cloud layer. On the other hand, it is shown that the bottom temperature exceeds 2000 K in the Lorentzian cases.

It is well-known that the CO2 line profile is sub-Lorentzian (Pollack et al. 1983). The present result supports this fact, and also indicates that the line profile given by Pollack et al. (1983) underestimates the infrared absorption of CO2. The CO2 line profile should be carefully examined in order to improve the radiative transfer model for the Venus atmosphere.