

A thermodynamic calculation for jovian planetary atmospheres

Ko-ichiro SUGIYAMA[1], Masatsugu Odaka[2], Kiyoshi Kuramoto[3], Yoshi-Yuki Hayashi[3]

[1] Earth and Planetary Sci., Hokkaido Univ, [2] Mathematical Sciences, Univ. Tokyo, [3] Earth and Planetary Sci., Hokkaido Univ.

An equilibrium thermodynamic calculation method is newly developed to investigate vertical profiles of temperature and condensed species of the Jovian planetary atmospheres. The utilized method is to obtain equilibrium composition by minimizing thermodynamic function. Its advantage is that we do not have to know the details of corresponding chemical reaction formulae. Assuming ideal gas and ideal solution, the calculation scheme is greatly simplified so that the atmospheric composition can be changed with ease.

Our method yields the vertical profiles of temperature and condensed species of the Jovian atmosphere quite similar to those obtained in the earlier studies. By the use of our new scheme, the equilibrium vertical profiles of the Jovian atmospheres can be obtained more easily.