Mid-latitude disturbances in the Martian atmosphere studied with MRO MCS data

*柿沼 希泉[1]、今村 剛[1]、青木 翔平[1]、野口 克行[2]、Kleinboehl Armin[3]
*Nozomi Kakinuma[1], Takeshi Imamura[1], Shohei Aoki[1], Katsuyuki Noguchi[2], Armin Kleinboehl[3]

1. 東京大学大学院新領域創成科学研究科、2. 奈良女子大学理学部、3. Jet Propulsion Laboratory, NASA
1. Graduate School of Frontier Sciences, The University of Tokyo, 2. Faculty of Science, Nara Women's University, 3. Jet Propulsion Laboratory, NASA

Similarly to the Earth, baroclinic waves are thought to play a significant role also on Mars in determining the climate at mid-to high-latitudes. It is known that baroclinic waves with zonal wavenumbers 1, 2, and 3 are dominant and they become the strongest from autumn to winter in the northern hemisphere(Banfield et al., 2004). In addition, the connection between the baroclinic waves and the dust cycle near the surface in the northern hemisphere has been reported (Hinson et al., 2012). However, previous studies investigated the behavior of the waves below the 18Pa level (Banfield et al., 2004). The way of the propagation of the waves at higher altitudes is still unknown.

We have examined the behavior of the waves using Mars Reconnaissance Orbiter (MRO) Mars Climate Sounder (MCS) limb observations data. The retrieved data of temperature, dust, and water ice within a pressure range from 200 to 1 Pa, corresponding to the altitude range from about 10 to 55 km above surface, are used in our analysis. We focused on the mid-to high-latitudes in the northern hemisphere, since the baroclinic waves appear more strongly than in the southern hemisphere. Temperature fluctuations are analyzed after dividing the data into time intervals with a length of 1 Martian day and subtracting the seasonal trend. This makes it possible to see the propagation of the waves with a time resolution of 1 Martian day. Then, we have investigated how the meridional distribution of the wave amplitude changes with time.

In the future, we will examine how the baroclinic waves have an influence on the dust and water ice transportation in high altitudes.

キーワード：火星、大気、大気力学
Keywords: Mars, Atmosphere, Atmospheric Dynamics

