

WAVENUMBER-FREQUENCY SPECTRA OF THE MARS ATMOSPHERE: LOW LATITUDES

*小郷原 一智¹

*Kazunori Ogohara¹

1. 滋賀県立大学工学部

1. School of Engineering, University of Shiga Prefecture

Atmospheric waves in the Martian atmosphere have been studied since Zurek (1976; 1980; 1981) started theoretical studies on atmospheric thermal tides embedded in observations by the Viking Landers. In 1990's, Wilson and Hamilton (1996) analyzed Viking/IRTM data to clarify thermal tides and simulated them. Hollingsworth et al. (1997) suggested the existence of "storm zone" such as storm tracks in the terrestrial atmosphere by numerical simulations of baroclinic waves. Since 2000's, various atmospheric waves have been detected in atmospheric temperature data observed by Thermal Emission Spectrometer onboard Mars Global Surveyor (MGS/TES).

However, what has been well investigated are relatively large scale waves with wavenumber 1-3 such as baroclinic wave in the winter hemisphere and planetary wave in middle and high latitudes. Atmospheric waves except for migrating and non-migrating thermal tides have not been reported in low latitudes, although atmospheric waves excited by diabatic heating associated with dust events and water ice clouds are expected to exist. In this study, we calculate wavenumber-frequency spectrum of atmospheric temperature T , zonal and meridional winds U and V , and detect all of resolvable atmospheric waves in low latitudes on Mars.

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