

Simulation of Martian atmosphere in CCSE/NIES AGCM

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The simulation of Martian General Circulation Model based in CCSR/NIES AGCM was performed and the results were analyzed. The main feature of this model is that it include the raising and movement of dust and they interact with the heating of atmosphere by dust.

The model generally reproduces the distribution of temperature and seasonal variation of zonal wind observed by Viking and Mars Global Surveyor. The model reproduces the distribution of dust observed by Mars Global Surveyor and the observational fact of Viking.

We compared spectral analyses of the model results with those of observational data of Viking Lander. As a result, baroclinic wave period and seasonal variation of the amplitude of diurnal tide generally resemble between model and observation.

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The model generally reproduces the distribution of temperature and seasonal variation of zonal wind observed by Viking and Mars Global Surveyor, however northern poleward heat flux in northern winter is strong. The model reproduces the distribution of dust observed by Mars Global Surveyor and the observational fact of Viking that the generations of dust storm occur especially in autumn and winter of northern hemisphere between latitude 10 and 30 degrees south. But the global dust storm does not seem to occur in the model, so there is not rapid increase of optical depth in it such as there is in observation. It does not reproduce the seasonal variation of surface pressure observed by Viking Landers because of the lack of the CO₂ polar process.

We compared spectral analyses of the model results with those of observational data of Viking Lander. As a result, baroclinic wave period and seasonal variation of the amplitude of diurnal tide generally resemble between model and observation, except smaller amplitude of diurnal tide in northern winter in the model.