

## 大気大循環モデルを用いた火星の水循環と HDO/H<sub>2</sub>O 同位体分別のシミュレーション：観測とモデルの国際連携に向けて

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### Simulation of the water cycle and HDO/H<sub>2</sub>O isotopic fractionation on Mars using a GCM: Towards the international collaborations

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We are simulating the water cycle of the present Martian environment using a Mars general circulation model (MGCM) for the investigations of the water cycle system and related material transport on Mars in collaboration with the current and future observations. We performed the horizontal high-resolution simulations with the grid intervals of ~67 km, showing the relationships between water transport and atmospheric dynamics more clearly than the previous low-resolution simulations (intervals of ~300 km). Our results show the consistent seasonal and latitudinal changes of zonal-mean water vapor column density and ice opacity with observations in the run without the radiative effects of water ice clouds. Also, we have implemented the HDO/H<sub>2</sub>O isotopic fractionations, and reproduced the qualitatively consistent seasonal and latitudinal changes of the ratio with a preceding simulation.

In this presentation, our future plans of international collaborations about the water cycle on Mars using this MGCM will be shown, including the observational missions such as ExoMars Trace Gas Orbiter and ground-based/airborne telescopes and also the intercomparison of MGCMs with water cycle in different approaches, especially in the framework of Japan-Belgium collaboration program, AMAVERO (Exploring the Atmosphere of MArs and VEnus with Remote Observations: A Belgium-Japan partnership).