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Excitations of the Earth and Mars' Variable Rotations by Surficial Fluids

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The dynamic interactions that occur between the solid Earth and surficial fluids are related globally by conservation of angular momentum in the Earth system. Owing to this condition, the surficial fluids have shown to be main excitation sources of the Earth's variable rotation on timescales between a few days and several years. Likewise, the Mars' rotation changes due to variations of atmospheric circulation and surface pressure, and the variable Martian polar ice caps associated with the CO_2 sublimation/condensation effects. Investigations of the Earth and Mars' rotations by surficial fluids may further our understandings of the Earth and planetary global dynamics. Here, we present our recent progresses on excitations of the Earth and Mars' rotational variations on multiple time scales: (1) differences between the NCEP/NCAR and ECMWF atmospheric excitation functions of the Earth's rotation, and (2) the Mars' rotational variations and the dust cycles during the Mars Years 24-31.