



Seasonal variations in the rotation of Mars

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Seasonal variations in the rotation of Mars are primarily driven by its atmosphere and involve an exchange of mass and/or momentum between the atmosphere and the solid body. In this study, we investigate the determination of seasonal variations of the Length-of-Day (LOD) and of the polar motion (PM). PM corresponds to the motion of the rotation axis in a reference frame tied to the planet. Mars' polar motion contains seasonal effects of the atmosphere as well as a resonance with a rotational normal mode of the planet, the Chandler Wobble (CW), which is the natural wobbling of an oblate planet that does not rotate around its principal moment of inertia. The period and damping of this mode are very interesting since they are linked to the interior structure of the planet. LOD variations are deviations from the uniform rotation speed of the planet. They are mostly related to the dynamics of the geophysical fluids of the system such as the core and atmosphere of Mars. The amplitudes of the PM and LOD variations calculated from the outputs of the General Circulation Models will be compared with the observed amplitudes from the tracking of Martian landers and orbiters. The improvements with the future missions and their implications for the Martian atmospheric dynamics and interior structure will be discussed.