MHD simulations of an Uranus type rotating magnetosphere

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The characteristic relaxation time of the Uranus magnetosphere is of the order of the planet's rotation period. This is also the case for Jupiter or Saturn. However, the specificity of Uranus (and to a lesser extent of Neptune) is that the rotation axis and the magnetic dipole axis are separated by a large angle (~60°) the consequence of which is the development of a highly dynamic and complex magnetospheric tail. In addition, and contrary to all other planets of the solar system, the rotation axis of Uranus happens to be quasi-parallel to the ecliptic plane which also implies a strong variability of the magnetospheric structure as a function of the season. The magnetosphere of Uranus is thus a particularly challenging case for global plasma simulations, even in the frame of MHD. We present MHD simulations of a Uranus type magnetosphere at both equinox (solar wind is orthogonal to the planetary rotation axis) and solstice (solar wind is orthogonal to the planetary rotation axis) configurations. The main differences between the two configurations will be discussed.