



Mass and energy transport in GUMICS-4 global MHD simulation: Locations and solar wind control of magnetopause entry sites

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We have developed a method which can be used to analyze the temporal and spatial variations of energy and mass transfer at the magnetopause using the GUMICS-4 global MHD simulation. Earlier results have pointed out that the Poynting flux focusing controls the magnetopause energy transfer both spatially and temporally during southward IMF. During northward IMF the spatial and temporal variations of solar wind energy transfer have been shown to be more difficult to categorize. Here we study the magnetopause energy and mass transfer locations during a variety of IMF and solar wind conditions in the GUMICS-4 global MHD simulation. First, we identify the locations at the magnetopause where the magnetosheath and magnetosphere magnetic field lines are antiparallel. Second, we investigate whether the energy and mass transfer rates at these reconnection locations dominate over other locations at the magnetopause. Finally, we investigate the dependency of the energy and mass transfer locations on the solar wind parameters.