



## Comparative Magnetotail Flapping: An Overview of Selected Events at Earth, Jupiter and Saturn

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Flapping, the vertical wavy motion of the magnetotail, is now a well-established phenomenon in the Earth's tail. Many events have been studied in the literature, using mainly data from Cluster and Double Star. Its characteristics are periods around 10 minutes, a propagation direction of the waves from the centre of the tail towards the flanks and a propagation speed of several tens km/s. In the Earth's tail the temporal gradient of the magnetic field  $dB_x/dt$  is in anti-phase with the  $v_z$  of the ion velocity. Recently, it has been shown that the properties of these waves are in good agreement with wave modes in a magnetotail current sheet with a double gradient ( $dB_x/dz$  and  $dB_z/dx$ ). During the various outer planet missions, spacecraft have sampled the magnetotails of Jupiter (e.g. Voyager, Galileo) and of Saturn (e.g. Cassini). In this presentation we will show observations of the Jovian, Kronian magnetotail where the magnetic field seems to show a flapping behaviour. These magnetometer observations, when possible, are enhanced with particle data information. For some of the events, the case for a flapping behaviour can be made, and these will be studied in more detail.