



Using Europa's and Ganymede's Auroral Footprints to Compare Jovian Magnetic Field Models

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The submitted work describes a study of the auroral footprints triggered by the Galilean moons Europa and Ganymede in the Jovian ionosphere. Bonfond e.a. [1] located the footprints' UV emissions in imagery obtained by the Hubble Space Telescope (HST). Those data were used to compare the footprint positions, as predicted by different magnetic field models, to the observed positions.

The comparison analyzed the deviations between model and observation in two ways. First, the absolute distance between the footprints is determined. Afterwards, the component of the deviation along, and the one normal to the observed footprint path are studied separately. The footprint path of a satellite is the curve which would be obtained by mapping the entire orbit of that satellite along magnetic field lines onto the planet. This path is also provided by Bonfond e.a. [1].

The results of the analysis shall serve as a metric to compare magnetic field models, in their suitability of mapping the positions of Europa and Ganymede to the planet. This metric evaluates the models' performance in the different hemispheres, split into longitudinal regions, as a model may do better in one and worse in the other longitude range.

In the presented work, the analysis was applied to the Jovian magnetic field models of VIP4 [2] and VIPAL [3]. Already from the first analysis step, one can estimate that the accuracy of the VIPAL model seems to be better in the Northern hemisphere in most CML regions, while both models are comparable in accuracy in the Southern regions.

Literature

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