

Local time variations of the main auroral emission at Jupiter

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Abstract

The main auroral emission is associated with the ionosphere-magnetosphere coupling current system which is related to the corotation breakdown of plasma moving outward in the middle magnetosphere. The brightness of the main emission results from precipitation of downward moving electrons carrying the upward field aligned currents of this current system. We analyse the brightness and width of the main emission as a function of local time based on a series of FUV images obtained with Hubble Space Telescope between 1997 and 2007. Additionally, we magnetically map the location of the main emission on the equatorial plane. Our results show that there are systematic local time variations of the brightness, width and mapped position of the main emission which we discuss in terms of local time asymmetries in the magnetosphere. Finally, we compare our observations with simulations of the Jovian magnetosphere as well as with Galileo in situ measurements of field aligned currents and plasma flow in order to understand the local time dynamics of the Jovian system.