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Mapping the Jovian magnetosphere to the ionosphere with a global magnetospheric model: boundary between jovian auroral features controlled by the planetary rotation and by the solar wind

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We compare the high latitude Jupiter's northern auroral features, derived from HST/STIS FUV images, with the predictions of our new global magnetospheric model by mapping along magnetic field lines between the magnetosphere and the ionosphere.

The model includes terms of internal origin (VIP4 multipole and magnetodisc model) and of external origin (tail current system, combined with magnetopause closure currents of the paraboloid model).

We find that the main oval maps up to a radial equatorial distance of about 18 R_J . This is the region where the plasma produced by Io starts to lag rigid rotation and also where the dipole-like magnetic field lines transform into tail-like field lines on the nightside.

We also compare the model polar cap boundary and the polar cusp with observed high latitude features for various CMLs and global magnetospheric parameters.

Whereas the observed main oval is seen to rotate with the planet, we can find a limit inside which the auroral features remain organized with respect to the solar direction.

We suggest that this region represents the polar cap boundary and we compare it, in shape and location, with model predictions as CML varies. We also show that local time brightness asymmetries exist both along the main oval and along the polar cap

boundary, but that their variation are not correlated.