EPSC Abstracts
Vol. 9, EPSC2014-671, 2014
European Planetary Science Congress 2014

Weakening of Jupiter's main auroral emission in response to magnetospheric hot plasma injections

S.V. Badman (1), B. Bonfond (2), M. Fujimoto (3), M. Kagitani (4), Y. Kasaba (4), S. Kasahara (3), T. Kimura (3), H. Melin (5), G. Murakami (3), J.D. Nichols (5), T. Sakanoi (4), A.J. Steffl (6), C. Tao (7), F. Tsuchiya (4), T. Uno (4), A. Yamazaki (3), M. Yoneda (4), I. Yoshikawa (8), K. Yoshioka (3)
(1) Lancaster University, UK, (2) Université de Liège, Belgium, (3) JAXA Institute of Space and Astronautical Science, Japan, (4) Tohoku University, Japan, (5) University of Leicester, UK, (6) Southwest Research Institute, USA, (7) Research Institute in Astrophysics and Planetology, France, (8) University of Tokyo, Japan (s.badman@lancaster.ac.uk)

Abstract

We present images of Jupiter's northern UV aurorae taken by the Hubble Space Telescope as part of a large observing campaign in January 2014. The high time resolution observations allow the dynamics of the different components of the aurorae to be observed. Particular features of interest are large regions of diffuse emission, which occurred equatorward of the main oval, enveloping the auroral footprint of Ganymede. These diffuse, low latitude emissions are caused by the injection of hot plasma from the outer magnetosphere, a process which has previously been related to interchange between the flux tubes from the outer magnetosphere and outward-moving flux tubes loaded with iogenic plasma. Over the two-week observing interval the auroral signatures of two large injection events were observed, while the main oval generally decreased in intensity. We suggest that the overall dimming of the main oval results from the weakening of the corotation-enforcement currents that drive the main emission, following the replacement of the radially-stretched, mass-loaded flux tubes by more dipolar flux tubes containing rarefied hot plasma.

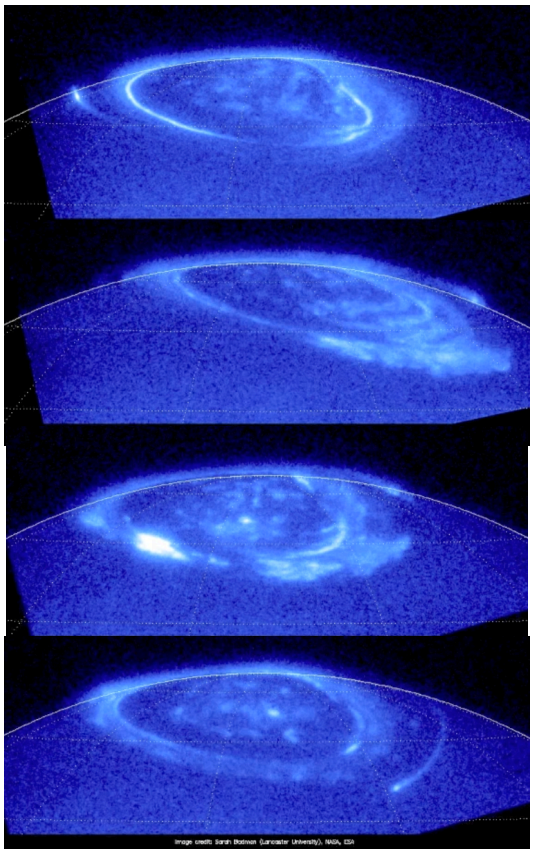

Figure 1: HST/STIS images of Jupiter's northern UV aurorae from January 2014. The narrow, intense main oval observed at the start of the observing interval on 1 Jan is shown at the top. The middle panels show two examples of low latitude diffuse emissions related to hot plasma injections accompanied by fainter main oval emission. The bottom panel shows an image taken on the last day of the campaign, 16 Jan, in which the main oval remains dim.