# Both solar wind-magnetosphere coupling and ring current intensity control of the size of the auroral oval

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Abstract: Two years of observations of the Earth's aurorae by the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) spacecraft are investigated to determine the factors controlling the size of the ionospheric polar cap and hence the latitude of the auroral oval. Regression analysis of the size of the auroral oval with respect to solar wind-magnetosphere coupling and the intensity of the Earth's ring current reveals that both play a role in determining the response of the aurora to geomagnetic storms. Specifically, we demonstrate that by considering the SW-M coupling and ring current intensity together, the correlation with the radius of the auroral oval is significantly better than if the two factors are considered individually. The results are discussed in terms of the solar windmagnetosphere interaction and internal feedback of the ring current on circulation of plasma within the magnetosphere. Copyright 2009 by the American Geophysical Union.

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