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## **Statistical Investigation of Ionospheric Storm and Substorm Events Using GEC and AE-Index**

Abstract:

Storm time modeling of Global Electron Content (GEC) calculated from JPL GIM-TEC for 1999 to 2014 is associated with variability of smoothed and normalized Auroral Electrojet index (AESn). The statistical analysis of DGEC values taking the hourly ratio of instant GEC to 7 preceding days median is made with storm onset determined by a joint analysis of variations in IMF-B magnitude, its derivative (dIMF-B) and direction of IMF-Bz together with sudden increase in AE exceeding 1,000 nT. The AESn index is related to DGEC through a polynomial whose coefficients are estimated in the Linear Least Squares sense. The statistics of estimated coefficients for ionospheric storms and substorms between 1999 and 2014 are modeled and classified with respect to the type and intensity of the storms. The positive correlation between the increase of AE and GEC can be a promising precursor of space weather variability. This study is supported by the joint grant from TUBITAK 112E568 and RFBR 13-02-91370-CT\_a.