Geophysical Research Abstracts
Vol. 16, EGU2014-7007, 2014
EGU General Assembly 2014

OVATION Prime -2013: Solar Wind Driven Precipitation Model Extended to Higher Geomagnetic Activity Levels

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OVATION Prime is an auroral precipitation model parameterized by solar wind driving. Distinguishing features of the model include an optimized solar wind-magnetosphere coupling function (dΦMP/dt) which predicts auroral power far better than Kp or other traditional parameters, the separation of aurora into categories (diffuse aurora, monoenergetic, broadband, and ion), the inclusion of seasonal variations, and separate parameter fits for each MLATxMLT bin, thus permitting each type of aurora and each location to have differing responses to season and solar wind input (as indeed they do). We here introduce OVATION Prime-2013, an upgrade to the 2008 version currently widely available. The most notable advantage of OP-2013 is that it uses UV images from the GUVI instrument on the satellite TIMED for high disturbance levels (dΦMP/dt > 12,000 (nT2/3 (km/s)4/3 which roughly corresponds to Kp = 5+ or 6-). The range of validity is thought to be about 0 < dΦMP/dt = 30000 (say Kp = 8 or 8+). Other upgrades include a reduced susceptibility to salt and pepper noise, and smoother interpolation across the postmidnight data gap. We will also provide a comparison of the advantages and disadvantages of other current precipitation models, especially OVATION-SuperMAG, which produces particularly good estimates for total auroral power, at the expense of working best on an historical basis.