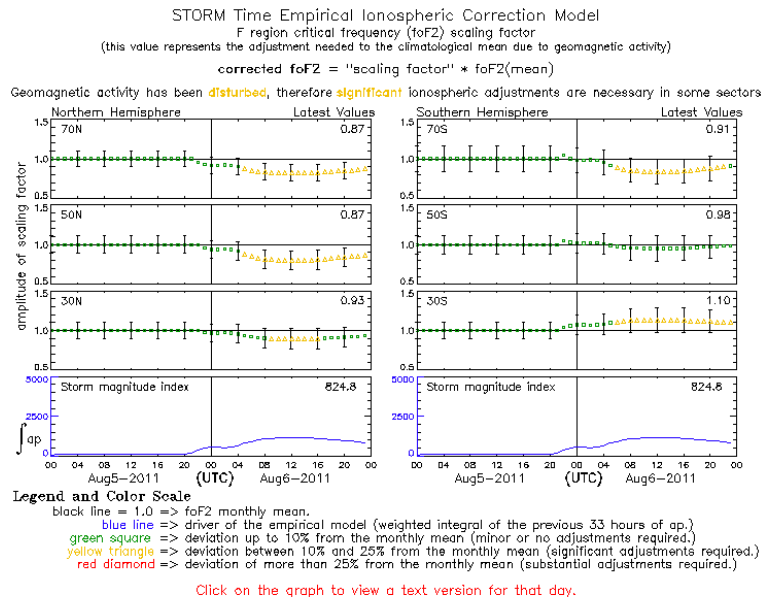


Positive Electron Density Enhancements Due to Geomagnetic Field Activity

Carl Luetzelschwab K9LA February 2012

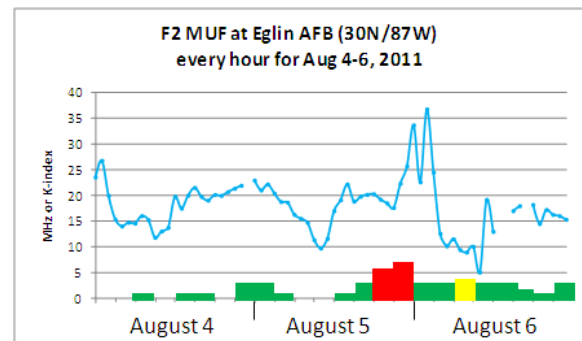
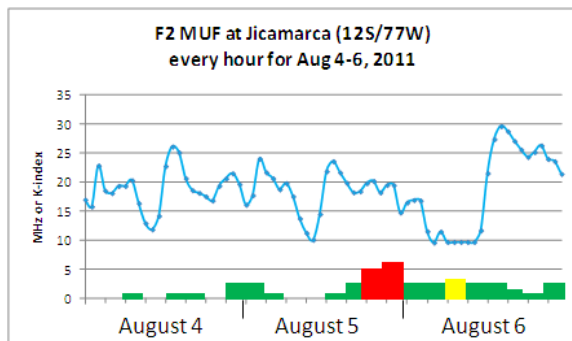
One of the products offered by the Space Weather Prediction Center (SWPC – part of the National Weather Service under NOAA) in Boulder, CO is the STORM model. This model predicts the deviation from the mean quiet-time F₂ region ionization due to geomagnetic field activity. To do this, the model uses the past 33 hours of the ap index (the linear equivalent of the quasi-logarithmic Kp index). The following plot is for August 5 and 6, 2011.



Latest Values at: 2011 Aug 06 2300 UTC (DOY = 218)
 Updated: 2011 Aug 06 2330 UTC

NOAA/SWPC Boulder, CO USA

The data are presented in three latitude bands (low, mid, and high) for both the northern and southern hemisphere. Note that an electron density enhancement, as opposed to an electron density depletion, is predicted at low latitudes in the southern hemisphere for the geomagnetic field activity on these dates. Since this is a model, how well does it reflect reality? Let's look at a mid latitude ionosonde in both hemispheres – Jicamarca in Peru for the southern hemisphere and Eglin AFB in Florida for the northern hemisphere.



After the spike in the K-index at the end of August 5, Jicamarca showed an enhancement on August 6 as predicted by STORM. Eglin showed the predicted depletion on August 6, but the model missed the short-term enhancement in electron density that occurred right after the spike in the K-index. Thus the STORM model appears to be a good indication of what the F₂ region is doing real-time, but be aware that it may not capture very short-term events.

For more on the STORM model, visit <http://www.swpc.noaa.gov/storm/index.html>.