

STORMTIME SAMI3/DATA COMPARISONS:

SAMI3/RCM (March 17, 2015)

SAMI3/ICON (May 8, 2005)

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San Francisco, CA

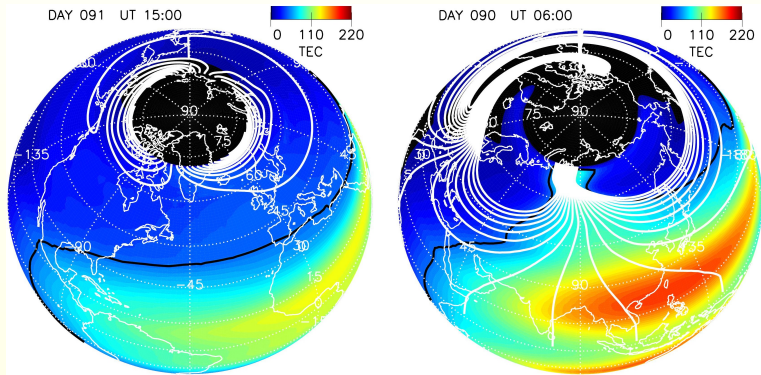
December 2016

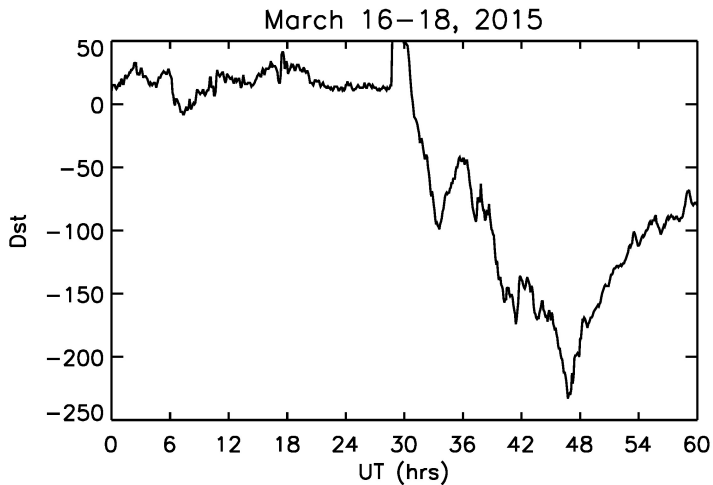
with A. Coster, S. Sazykin, A. Maute, and G. Crowley

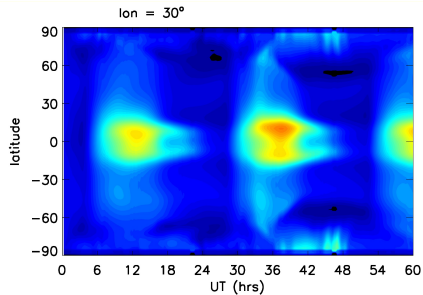
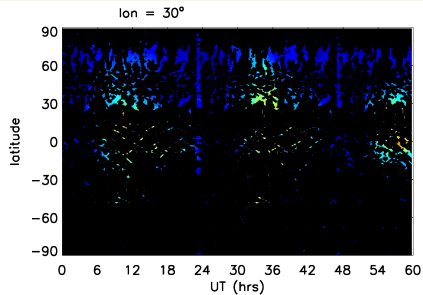
SAMI3/RCM COUPLED MODEL

electrodynamic

$$\nabla \cdot (\underbrace{\Sigma}_{\text{SAMI3}} + \underbrace{\Sigma_a}_{\text{RCM}}) \nabla \Phi = S(\underbrace{V_n}_{\text{HWM}}, \underbrace{J_{\parallel}(t)}_{\text{RCM}})$$

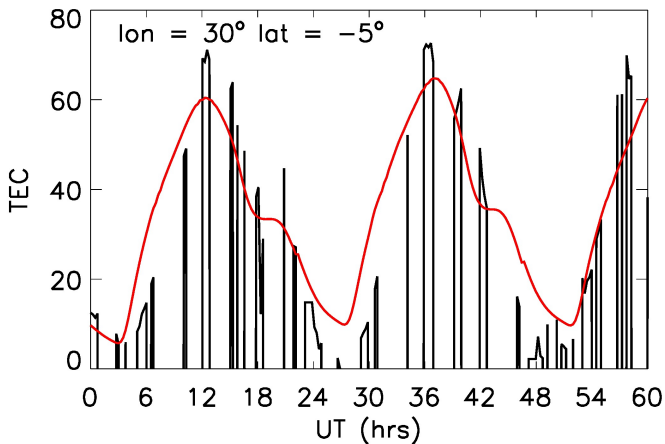






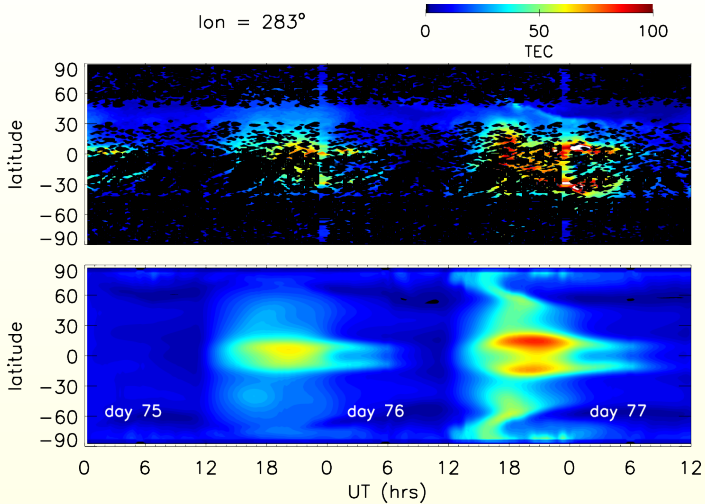
DATA/MODEL COMPARISON

longitude = 30° latitude = -5° (data: black; model: red)



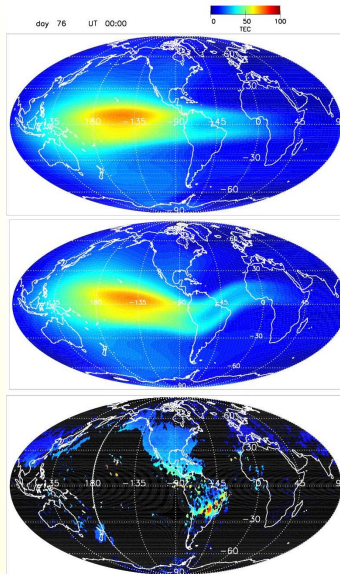
TEC DATA

longitude = 283°



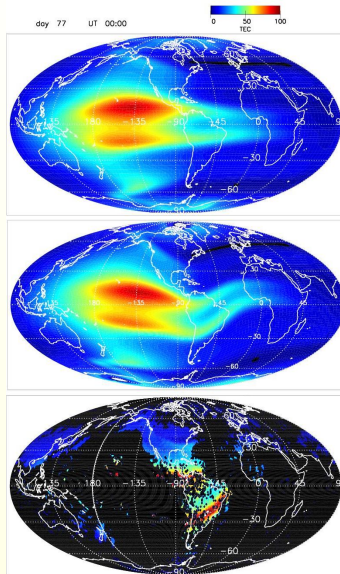
TEC DATA

march 17, 2015 at 00:00 UT



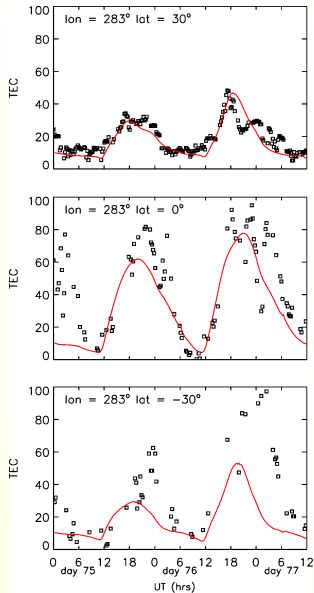
TEC DATA

march 18, 2015 at 00:00 UT

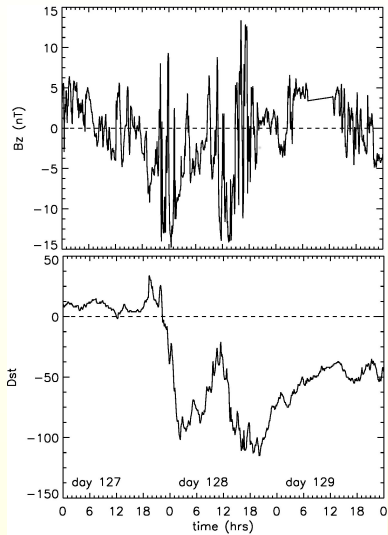


TEC DATA

comparison of data (black squares) and sami3 (red)

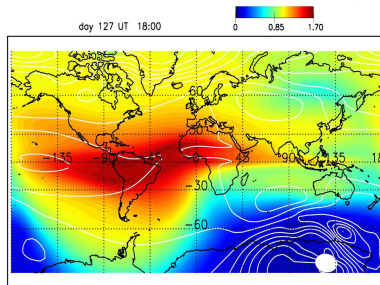
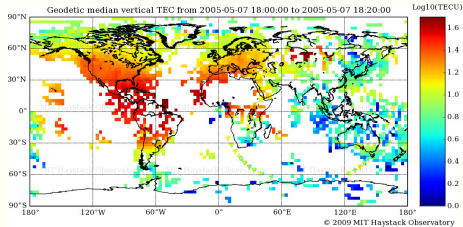


- SAMI3/TIEGCM/AMIE
- TIEGCM provides neutral composition, temperature, and winds to SAMI3 (i.e., one-way coupled)
- AMIE provides high-latitude potential
- SAMI3 uses IGRF via the Richmond apex model



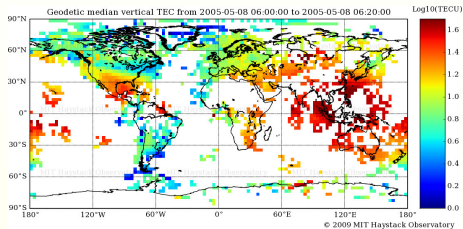
DATA/MODEL COMPARISON

may 7, 2005 (18:00 UT)

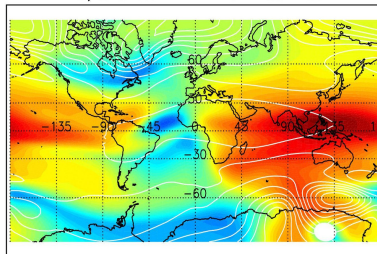


DATA/MODEL COMPARISON

may 8, 2005 (06:00 UT)

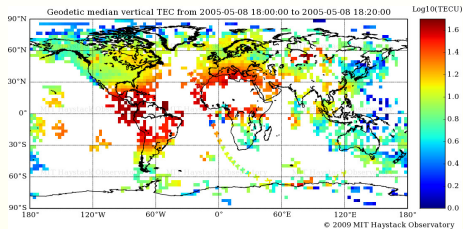


doy 128 UT 06:00

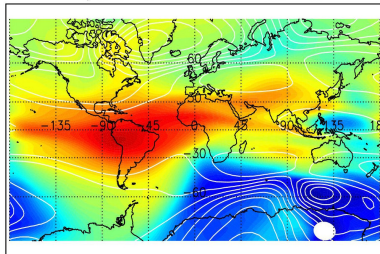


DATA/MODEL COMPARISON

may 8, 2005 (18:00 UT)

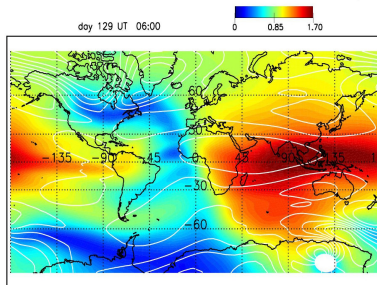
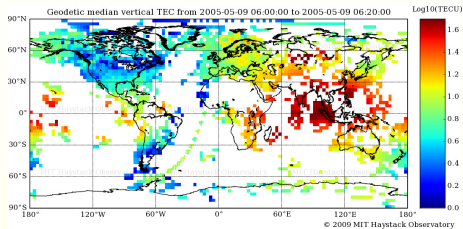


day 128 UT 18:00



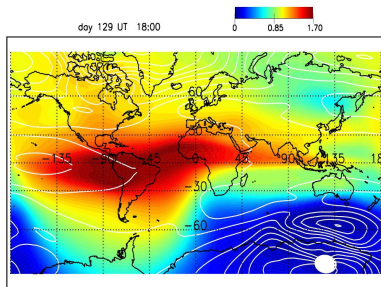
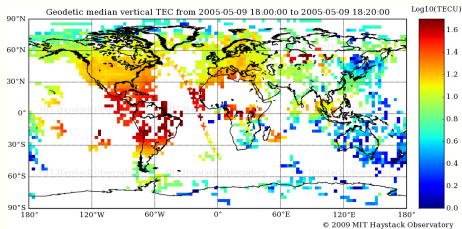
DATA/MODEL COMPARISON

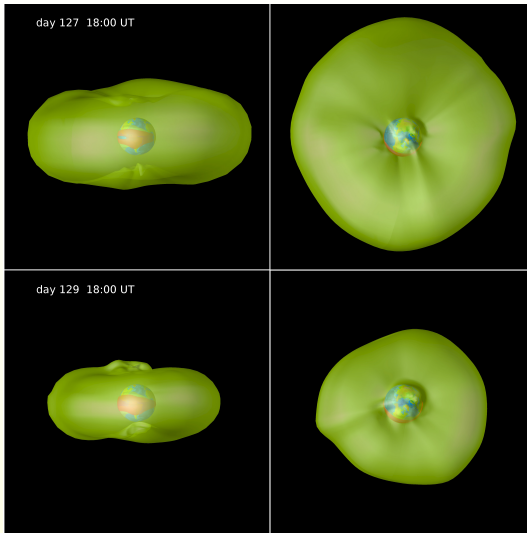
may 9, 2005 (06:00 UT)



DATA/MODEL COMPARISON

may 9, 2005 (18:00 UT)





SUMMARY

- SAMI3/RCM used to model March 17, 2015 storm
 - quantitative comparison with TEC data
 - model results agree reasonably well in the low- to- mid-latitude northern hemisphere but not very good in the southern hemisphere
 - caveat: SAMI3/RCM uses untilted, aligned dipole geomagnetic field; despite this results are good (offset model/data by difference in magnetic and geographic equator)
 - to be published in JGR (Huba et al., 2017)
- SAMI3/ICON used to model May 8, 2005 storm
 - quantitative comparison with TEC data
 - reasonable agreement
 - caveat: no stormtime penetration electric fields
 - submitted to Space Sci. Rev. (Huba et al., 2017)