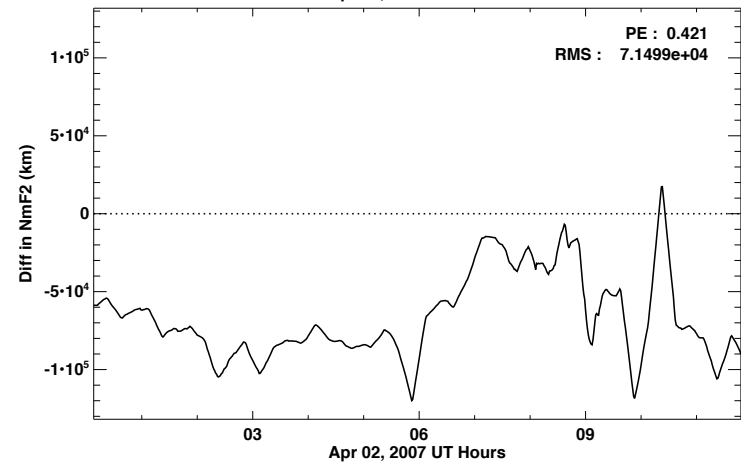
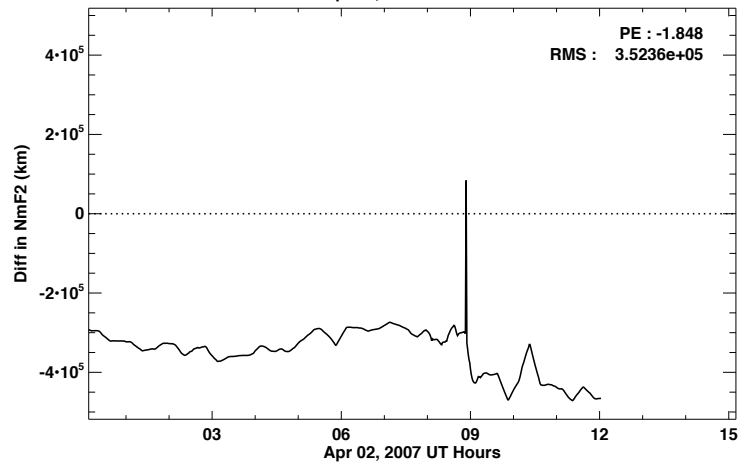
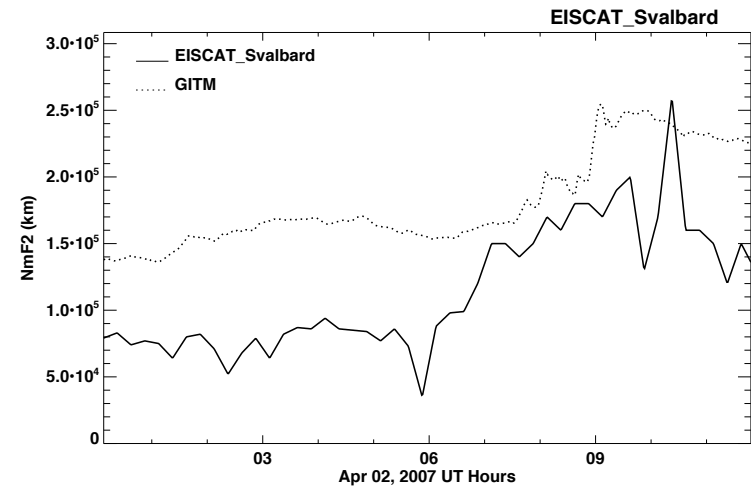
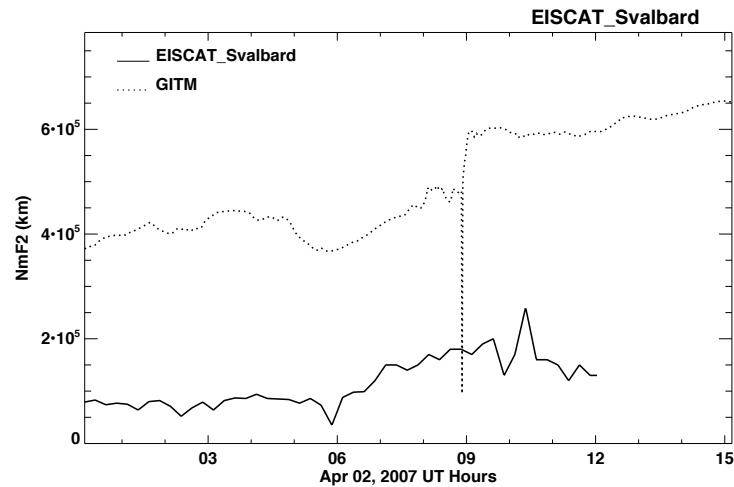


GITM results from a few years of simulations

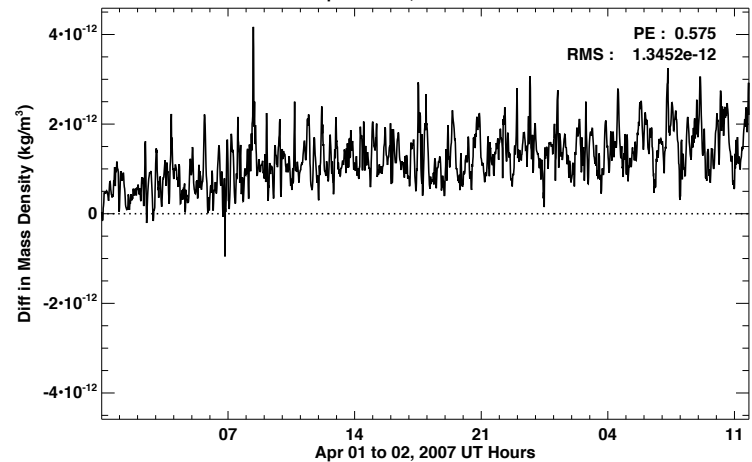
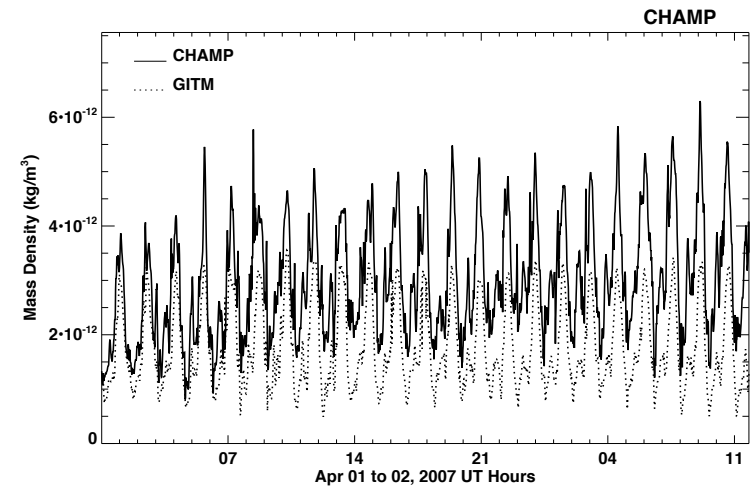
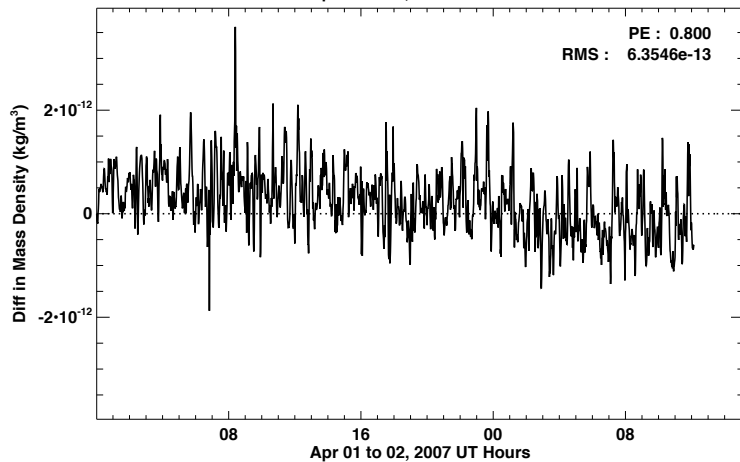
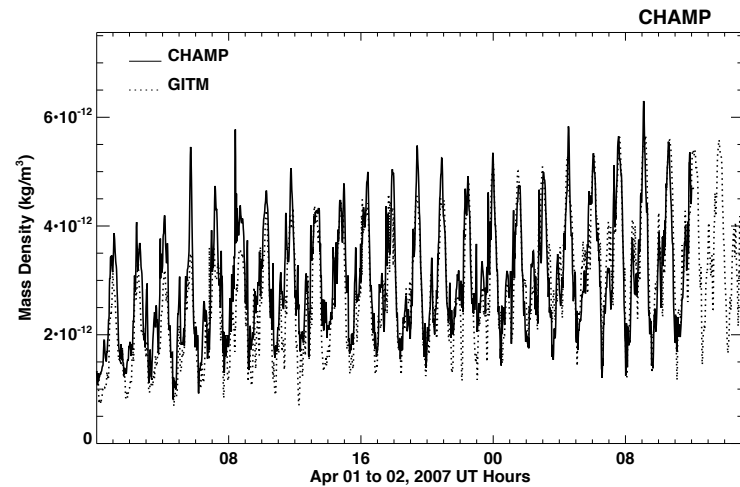
Aaron Ridley

Bad Results – Better Results



Eiscat NMF2

Good Results – Worse Results

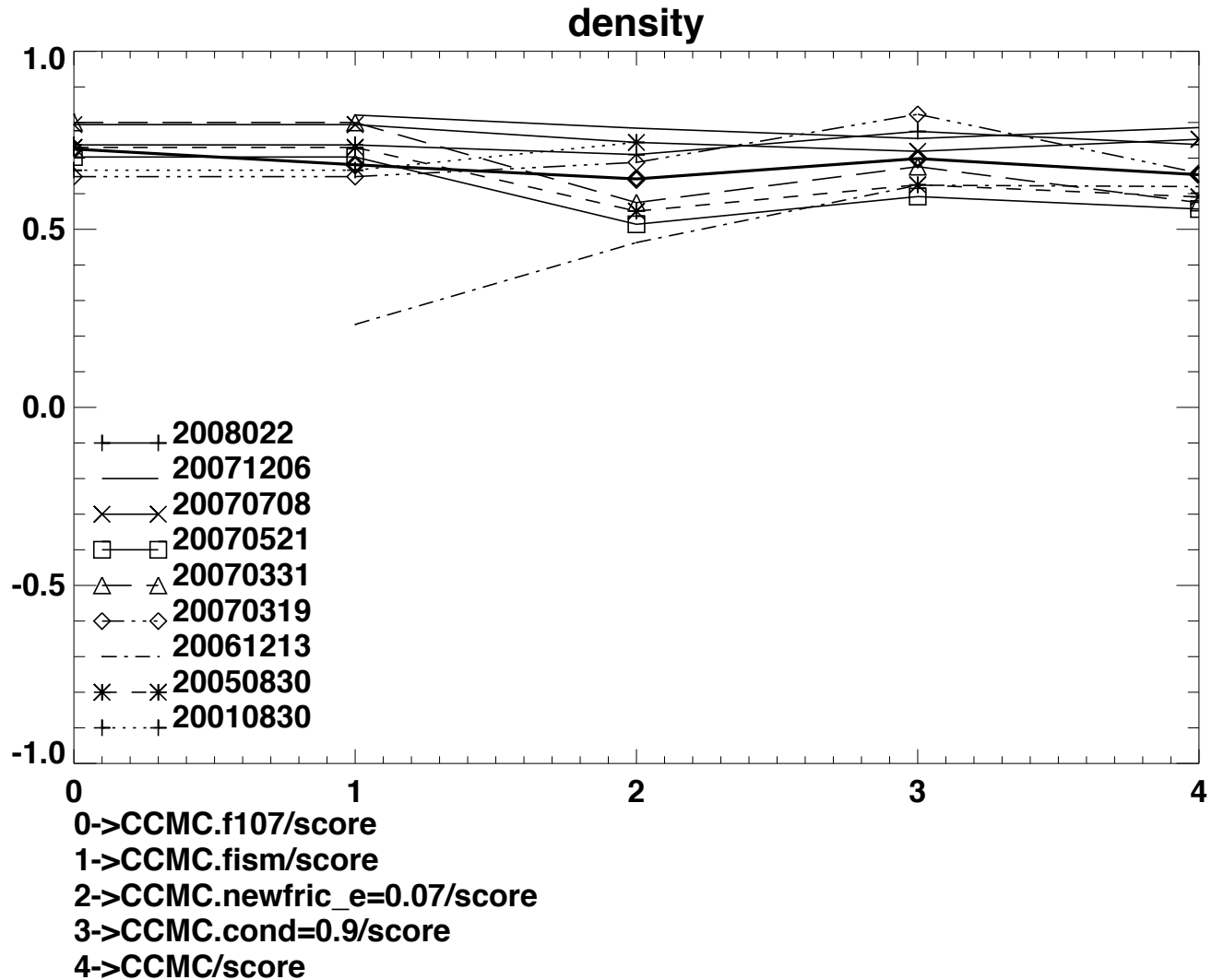


CHAMP Mass Densities

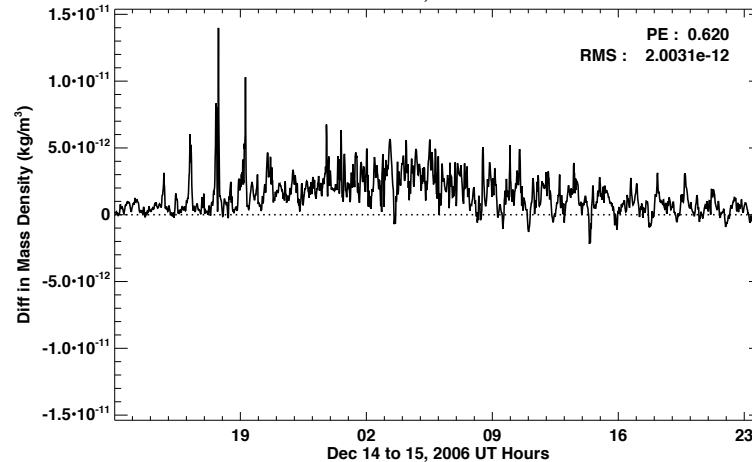
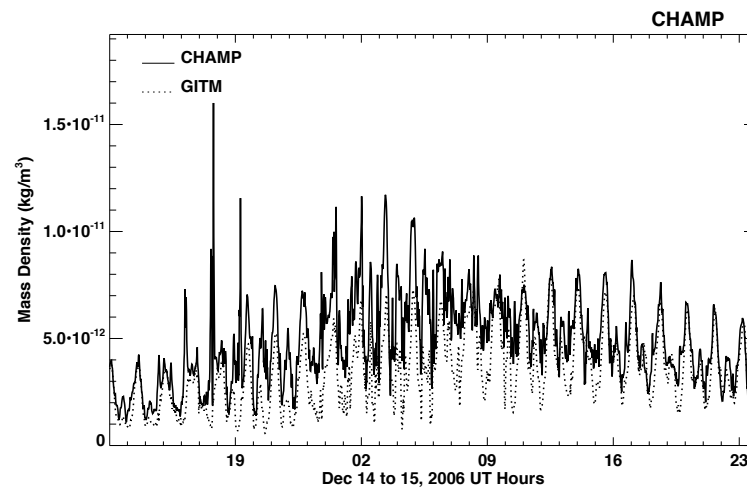
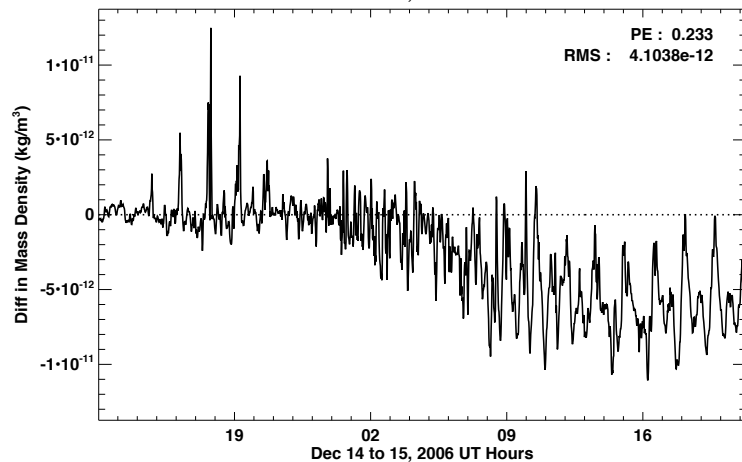
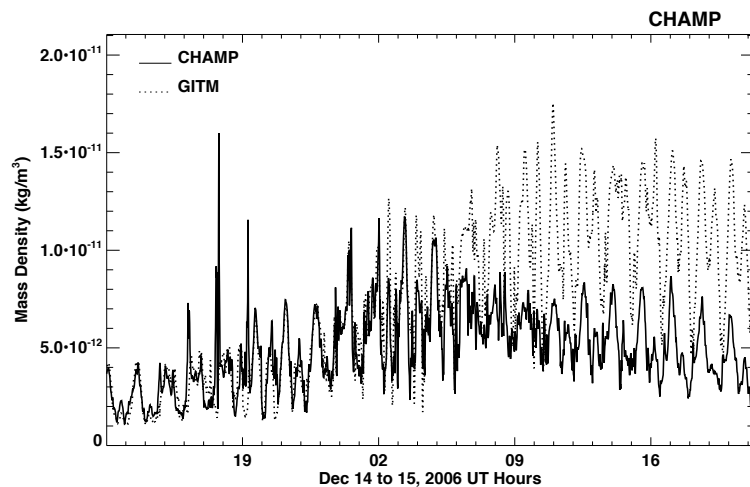
What did you do?

- F10.7 driven
 - Produced some of the worst results
- FISM
 - Produced great CHAMP results (most of the time)
 - Horrible electron density (GITM way to high!)
- When arguing about how to model Titan and Mars, we found a bug in the code in the molecular diffusion rates. This changed the diffusion significantly.
 - Had to compensate by adding more Eddy diffusion.
- This greatly improved the electron densities, but has cooled off the atmosphere too much
 - Not sure why, still investigating
 - Reduced the NO cooling
 - Increased the solar efficiency from 5% to 7%
 - Discovered that Eddy cooling was turned off by accident, which served to then cause the atmosphere to be even cooler. Crap.
 - Playing with the molecular conduction
 - Perhaps gravity wave heating?

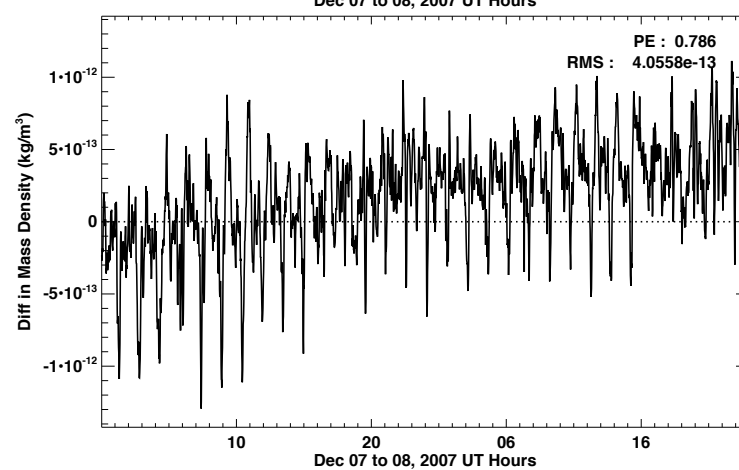
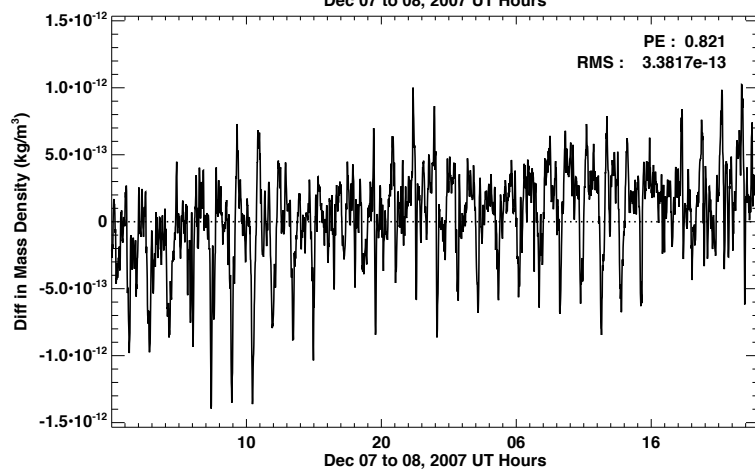
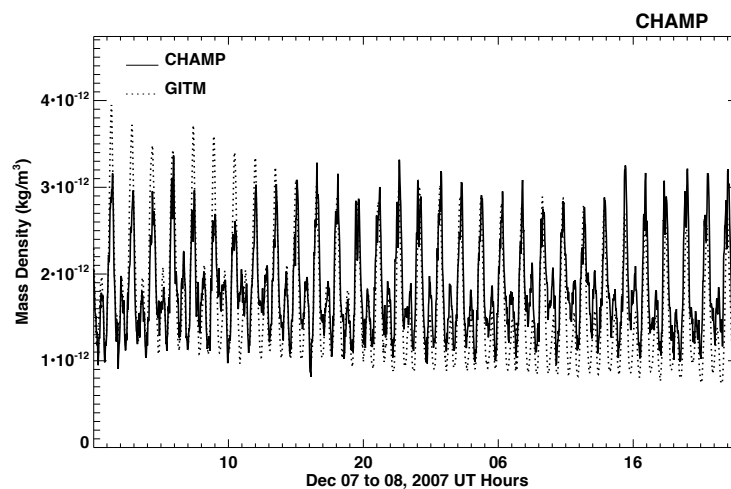
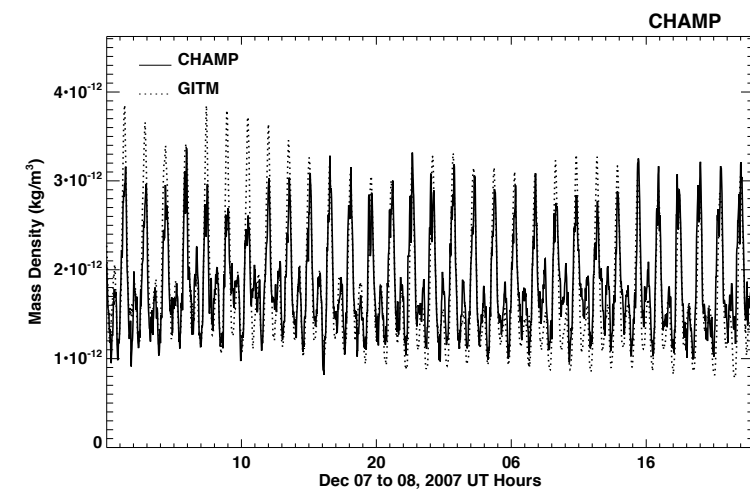
Prediction Efficiency



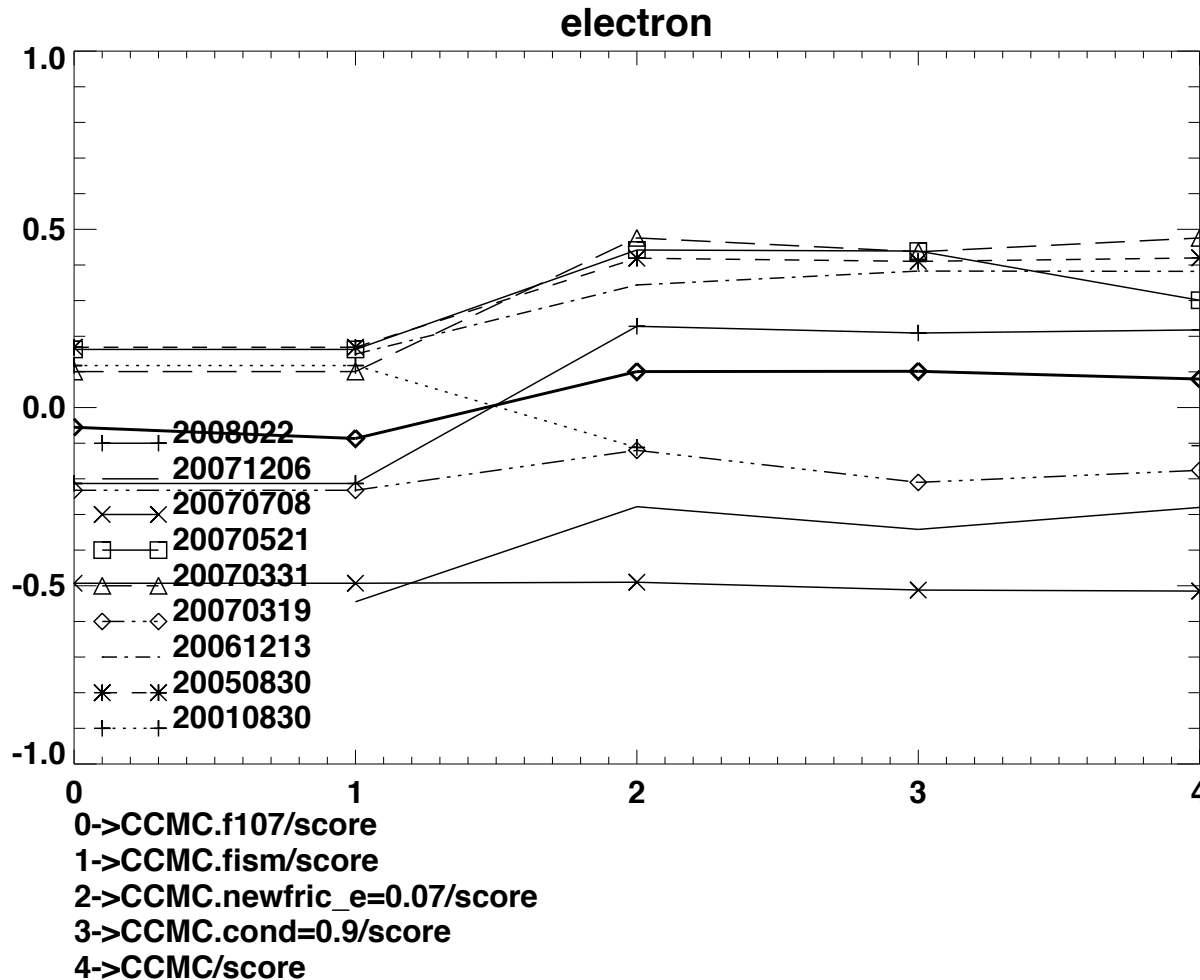
Old on Left, New on Right



Old and New

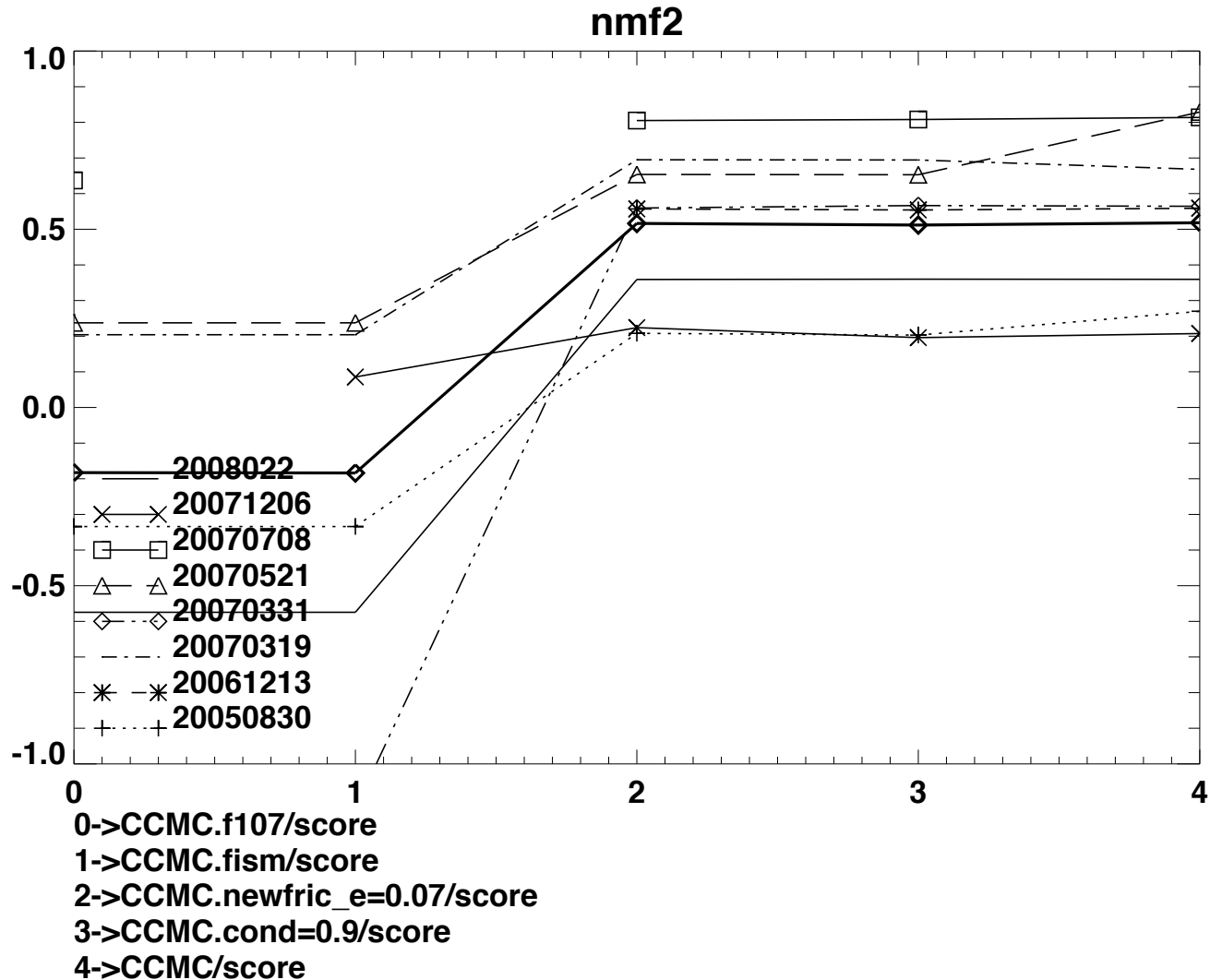


CHAMP Electron Density

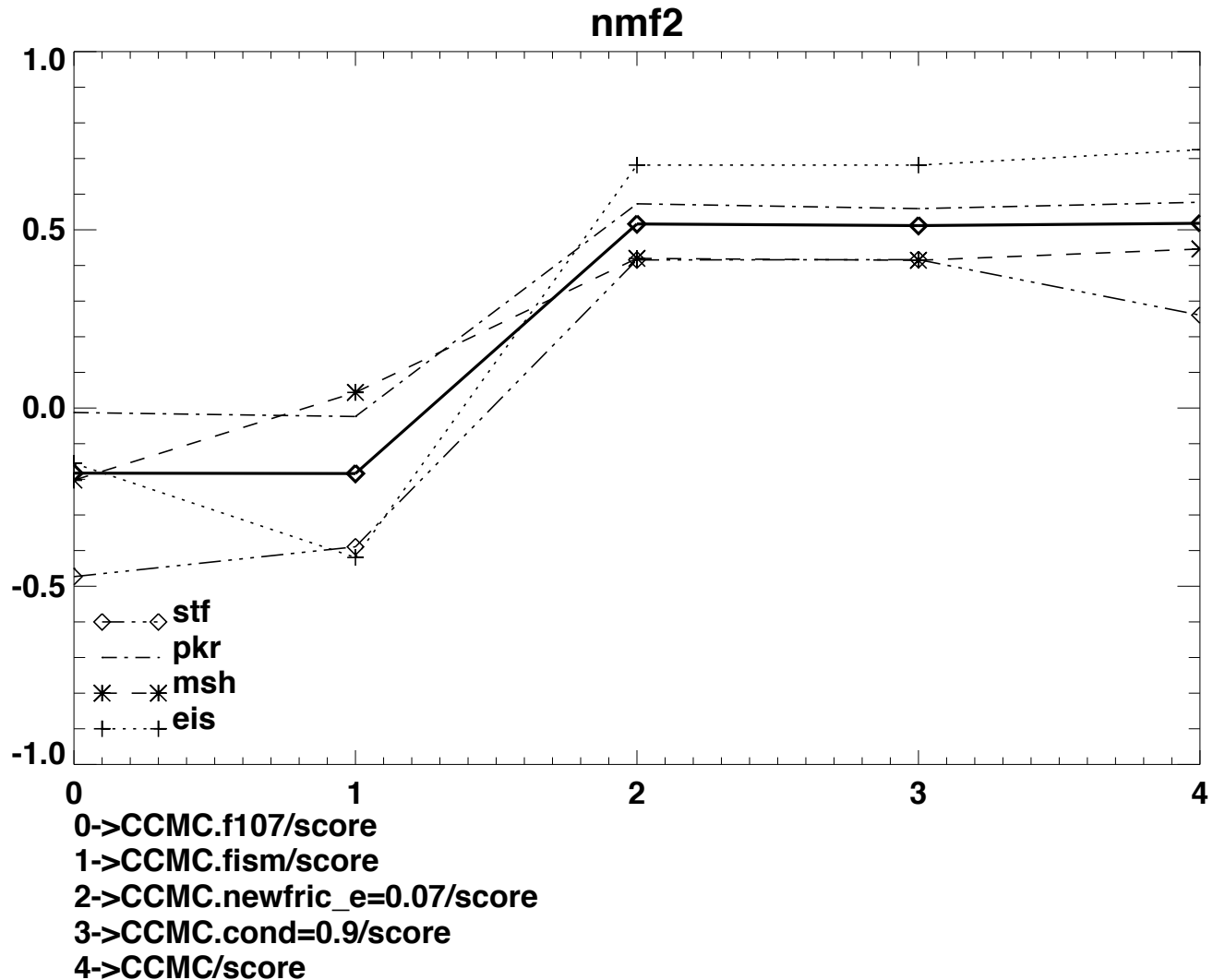


A lot of the bad results here have to do with the low latitude electrodynamics. We are currently trying to figure out why our equatorial vertical velocities are too high, which creates too large of a fountain effect.

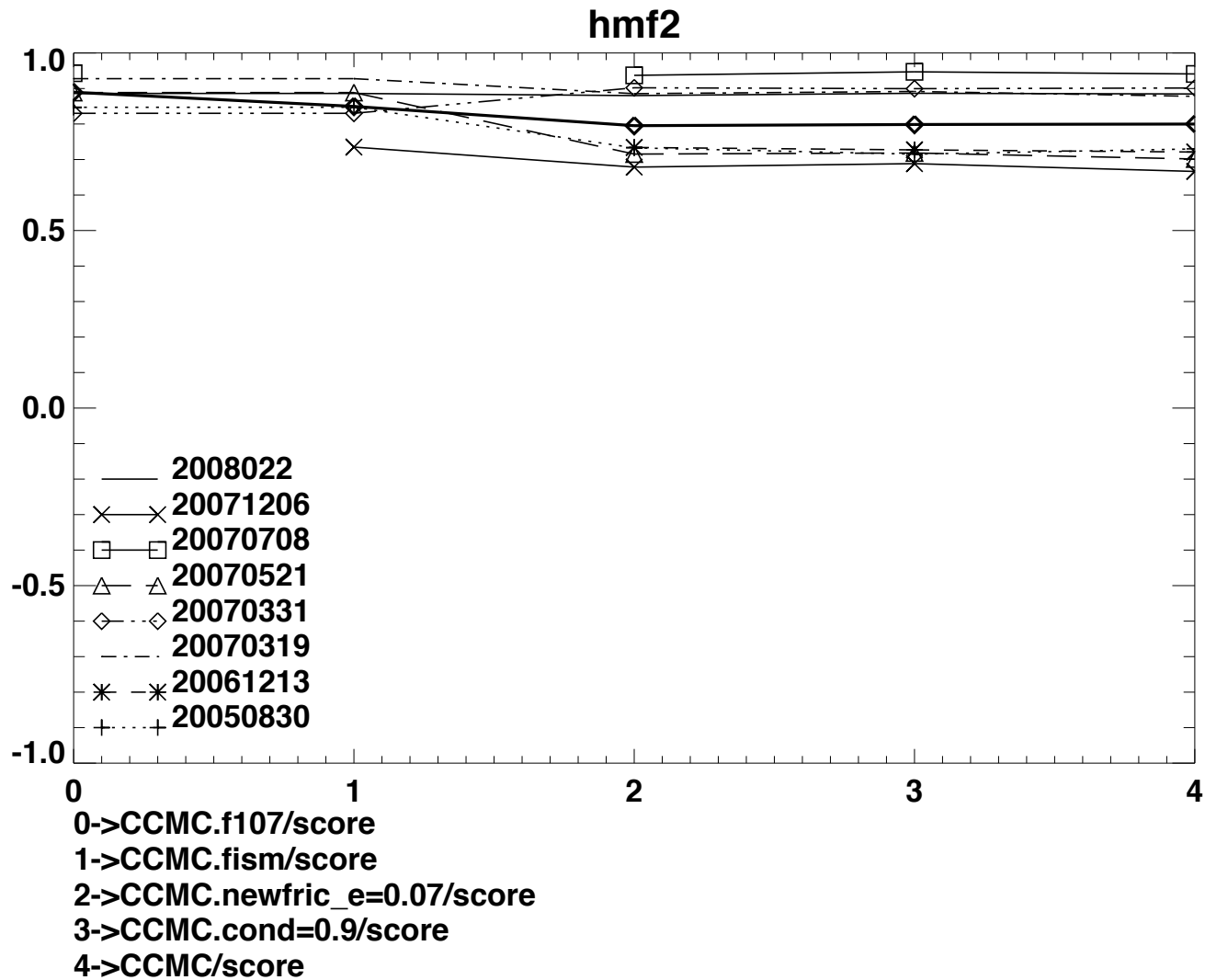
NMF2 from Radars (stations averaged)



NMF2 by station (events averaged)



HMF2 for Radars

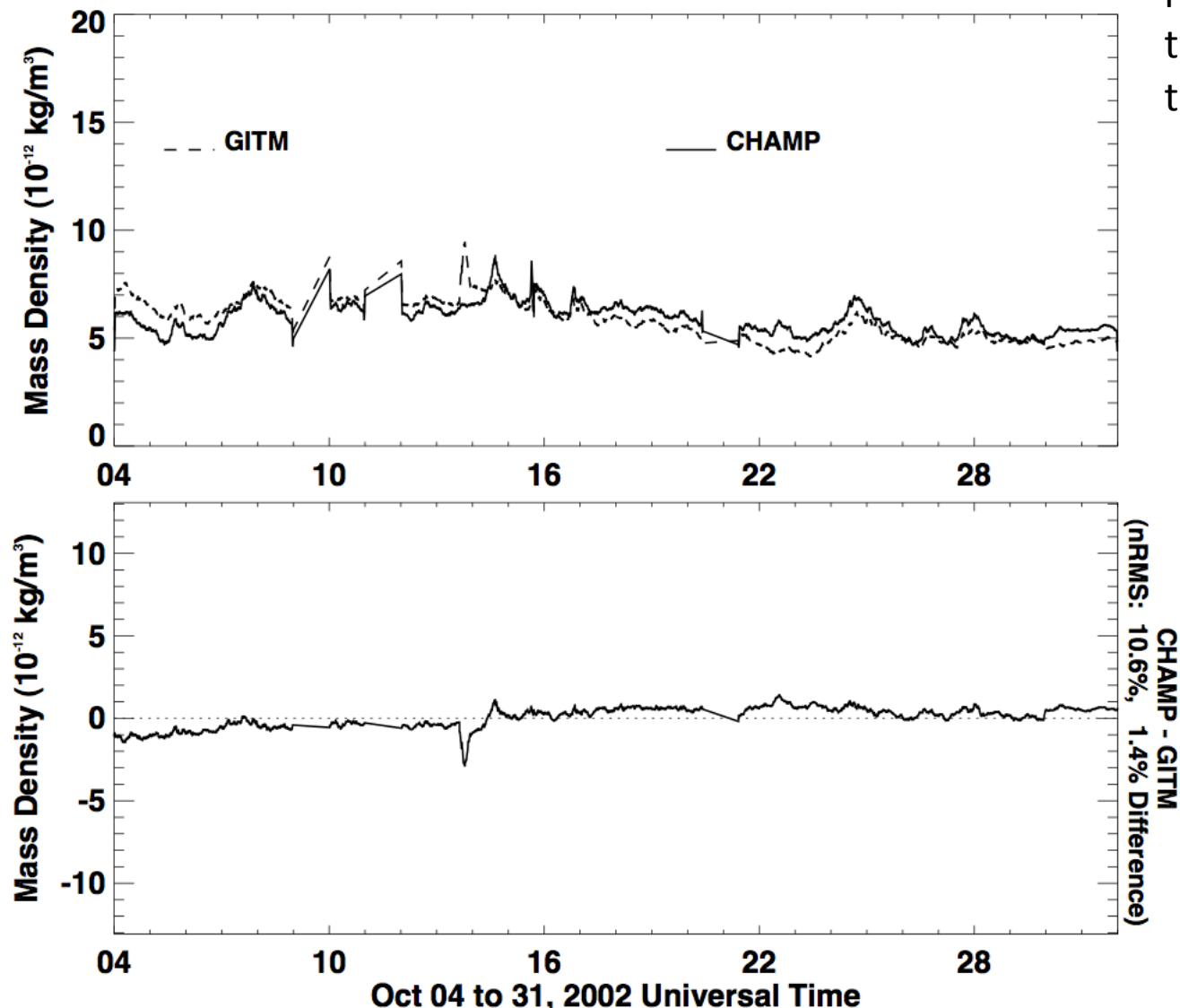


Validation Efforts

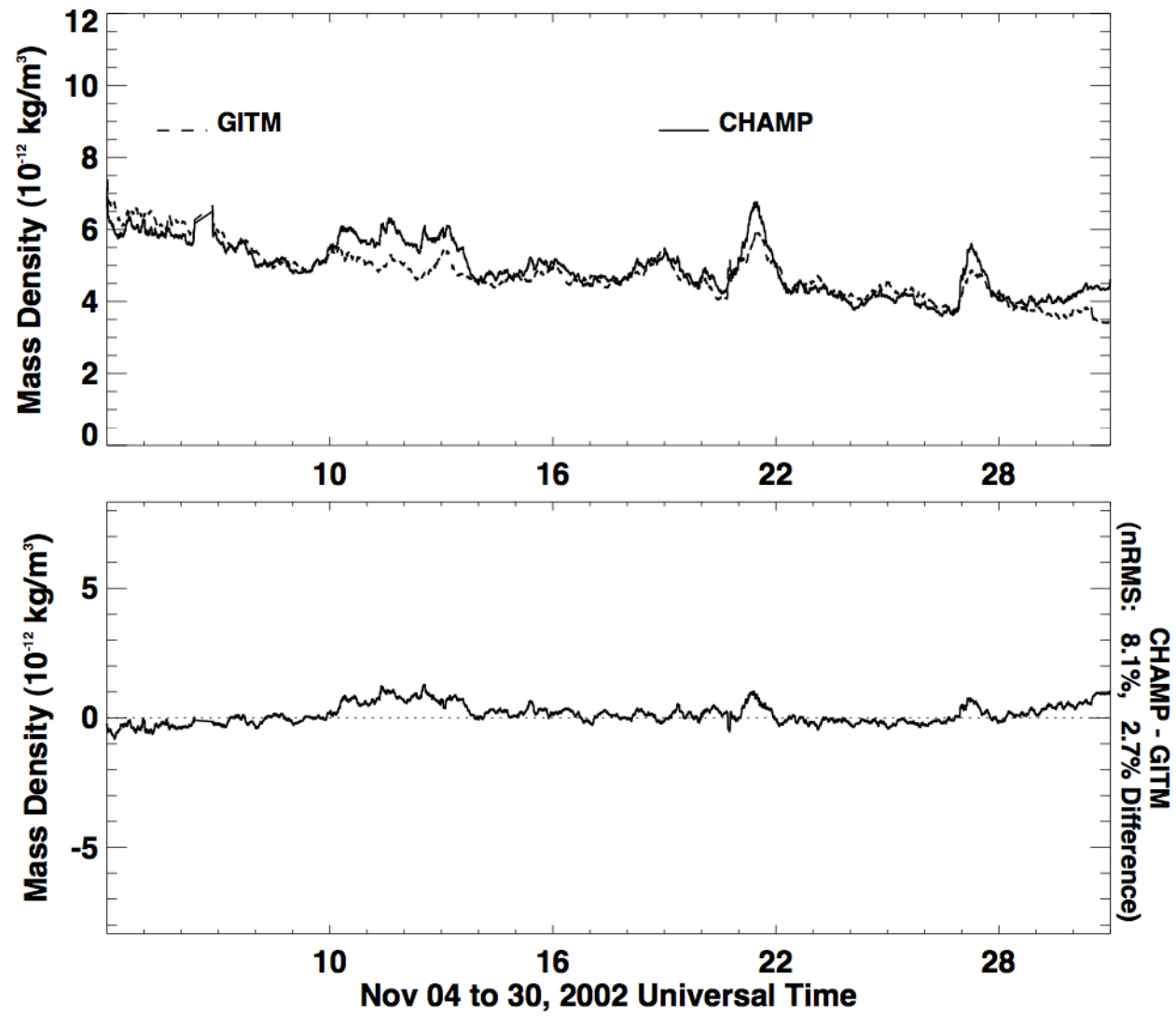
- We have run GITM from 2002-2005 (except for a few months in 2003).
- We have compared the results to CHAMP on a month by month basis.
- Here are some of the results.
- Which are preliminary. We haven't done too much analysis yet.

October 2002

This was run with GITM at 1.6 deg (lat) by 5.0 deg (lon) resolution. Each month took approximately 4 days to run on 96 processors.

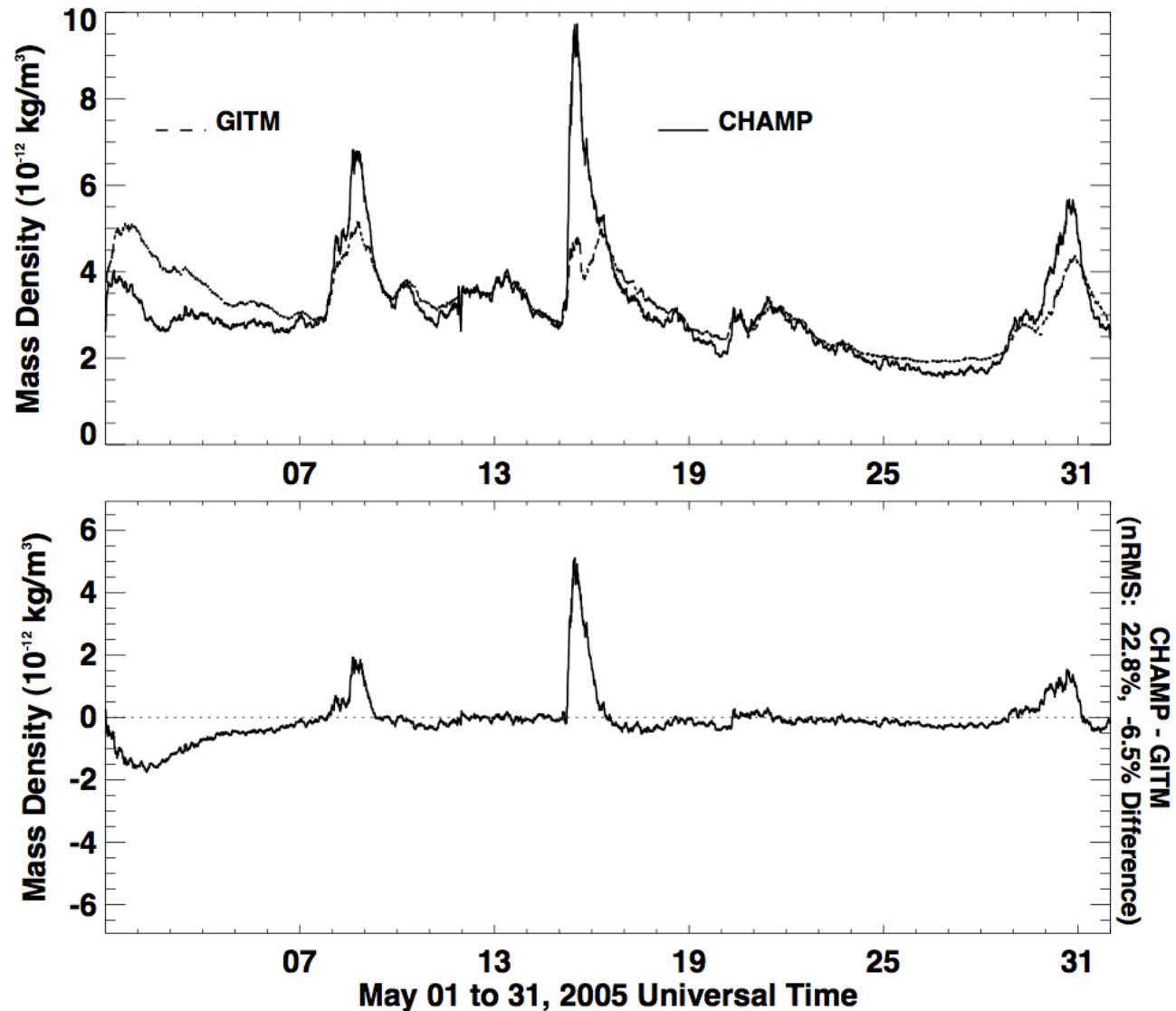


November 2002

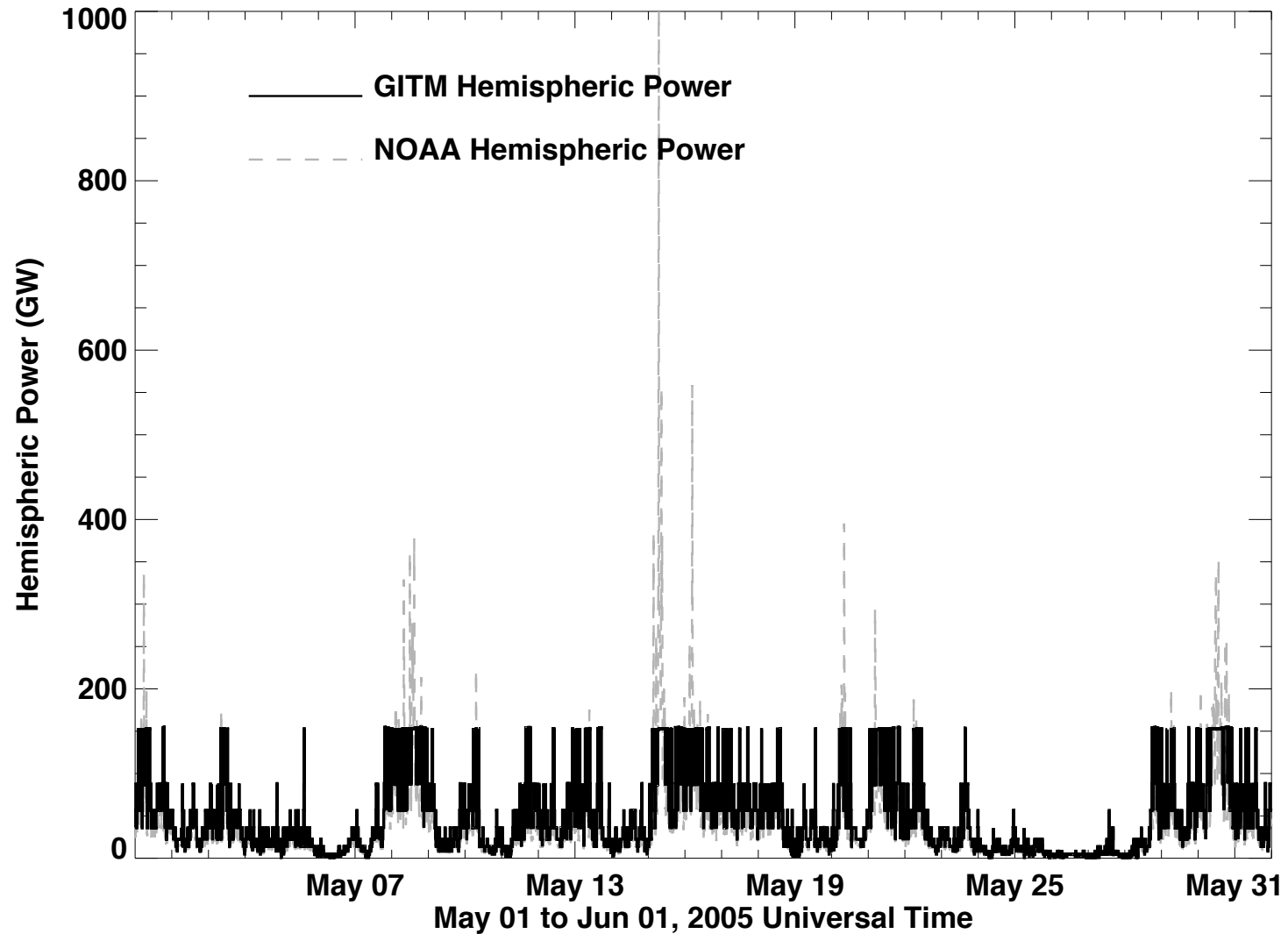


May 2005

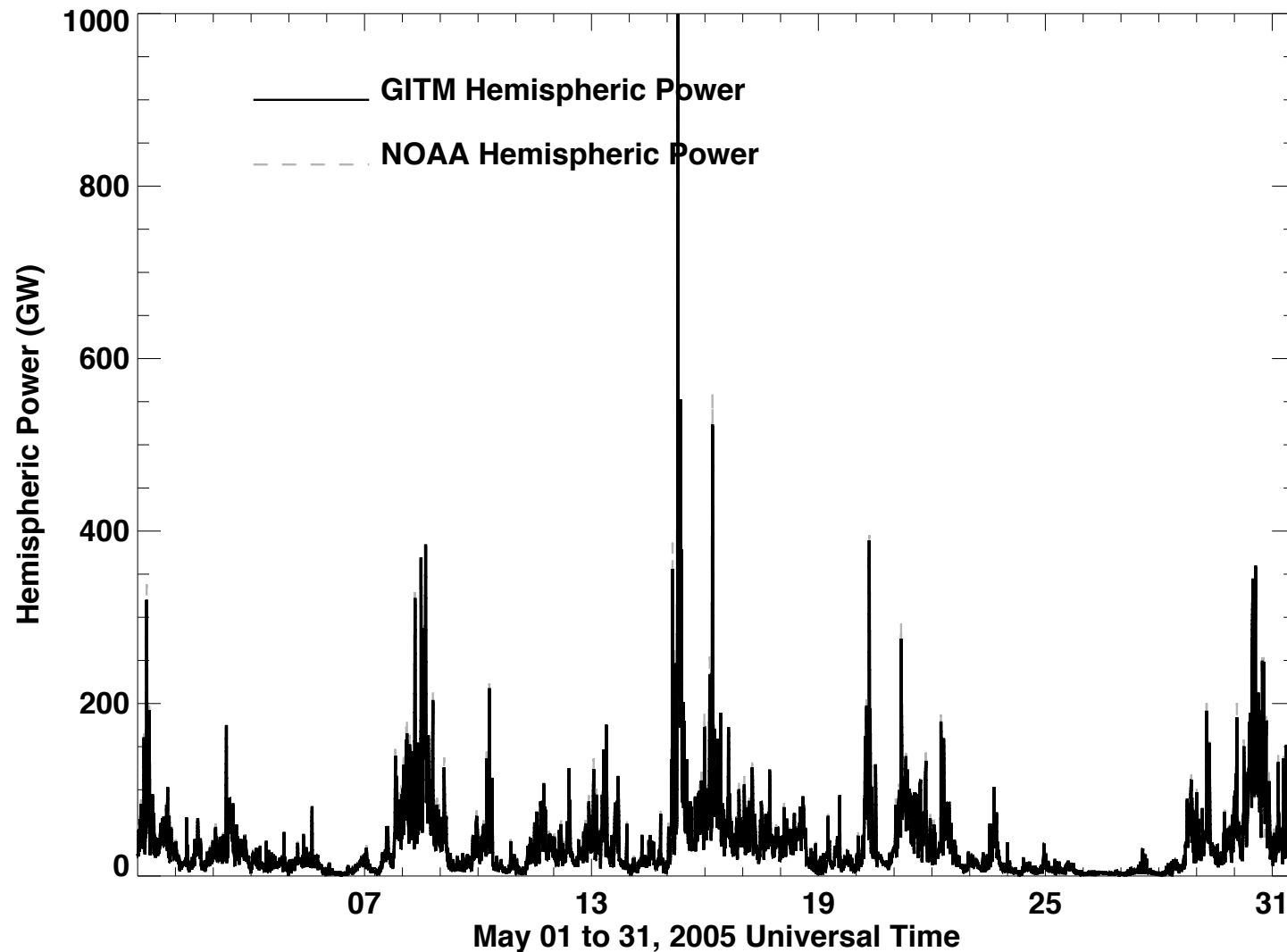
Notice the bad
performance during
the storm



Problem

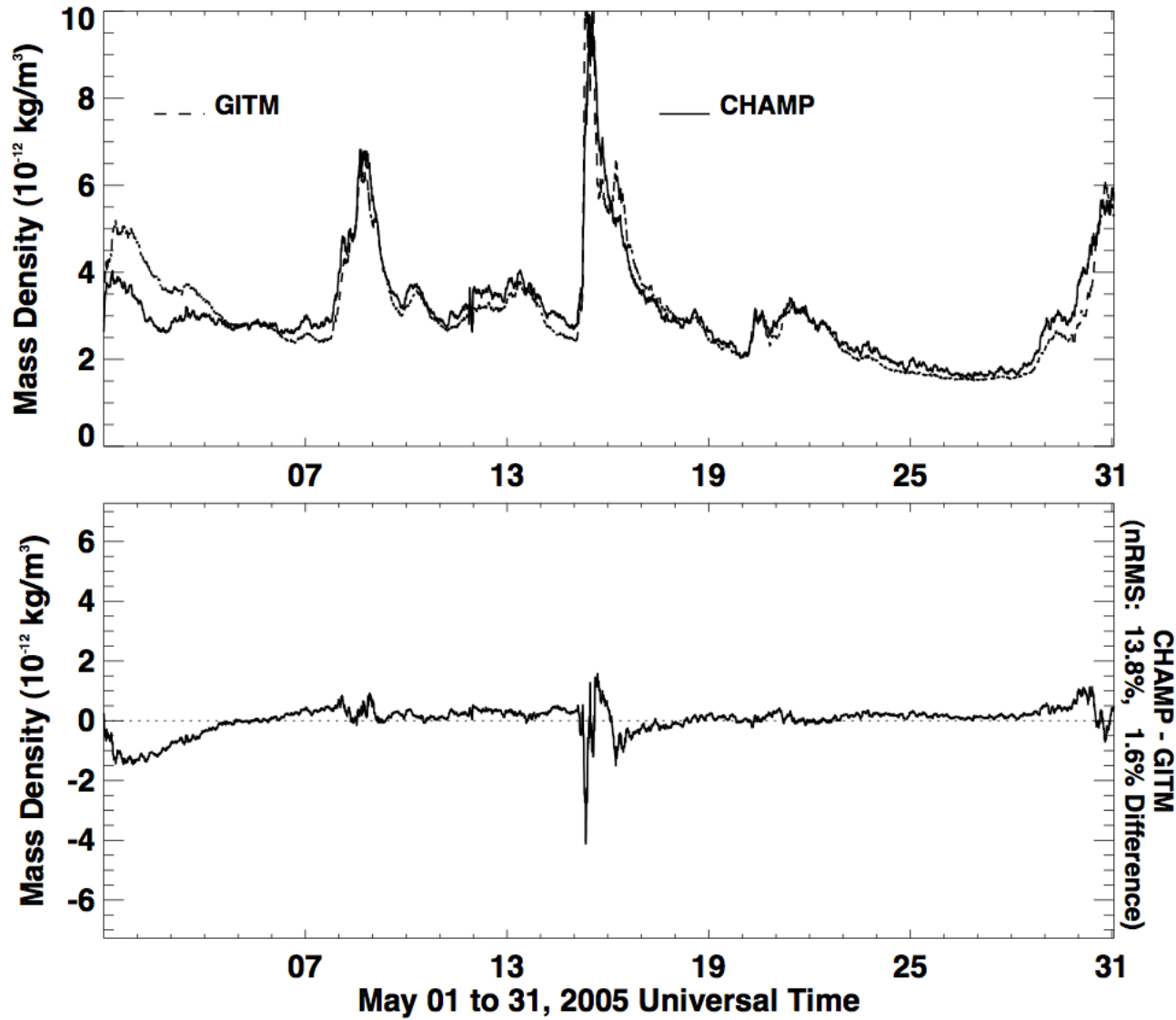


Solution

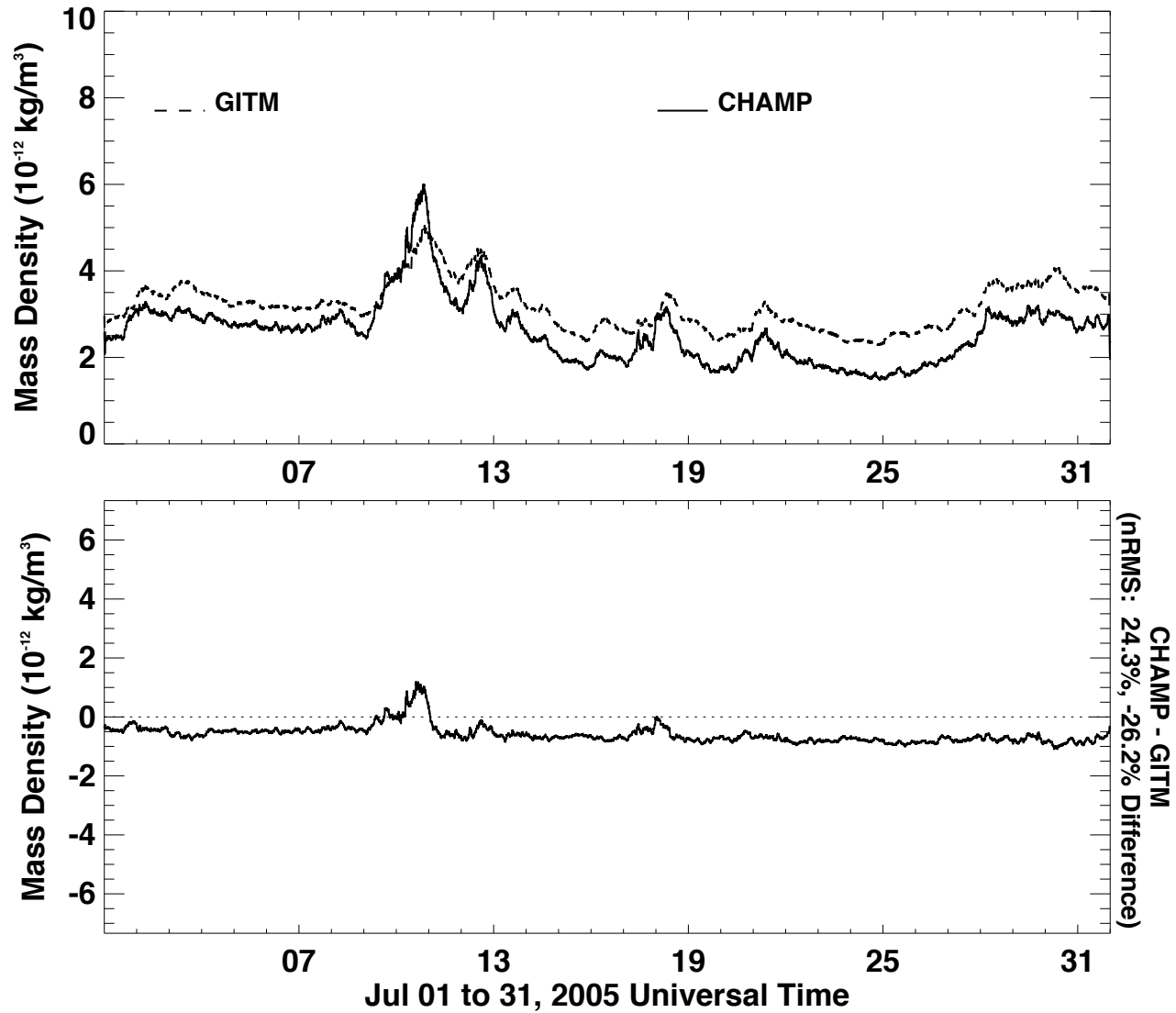


May 2005 - Again

Reran using improved
hemispheric power



Bias!

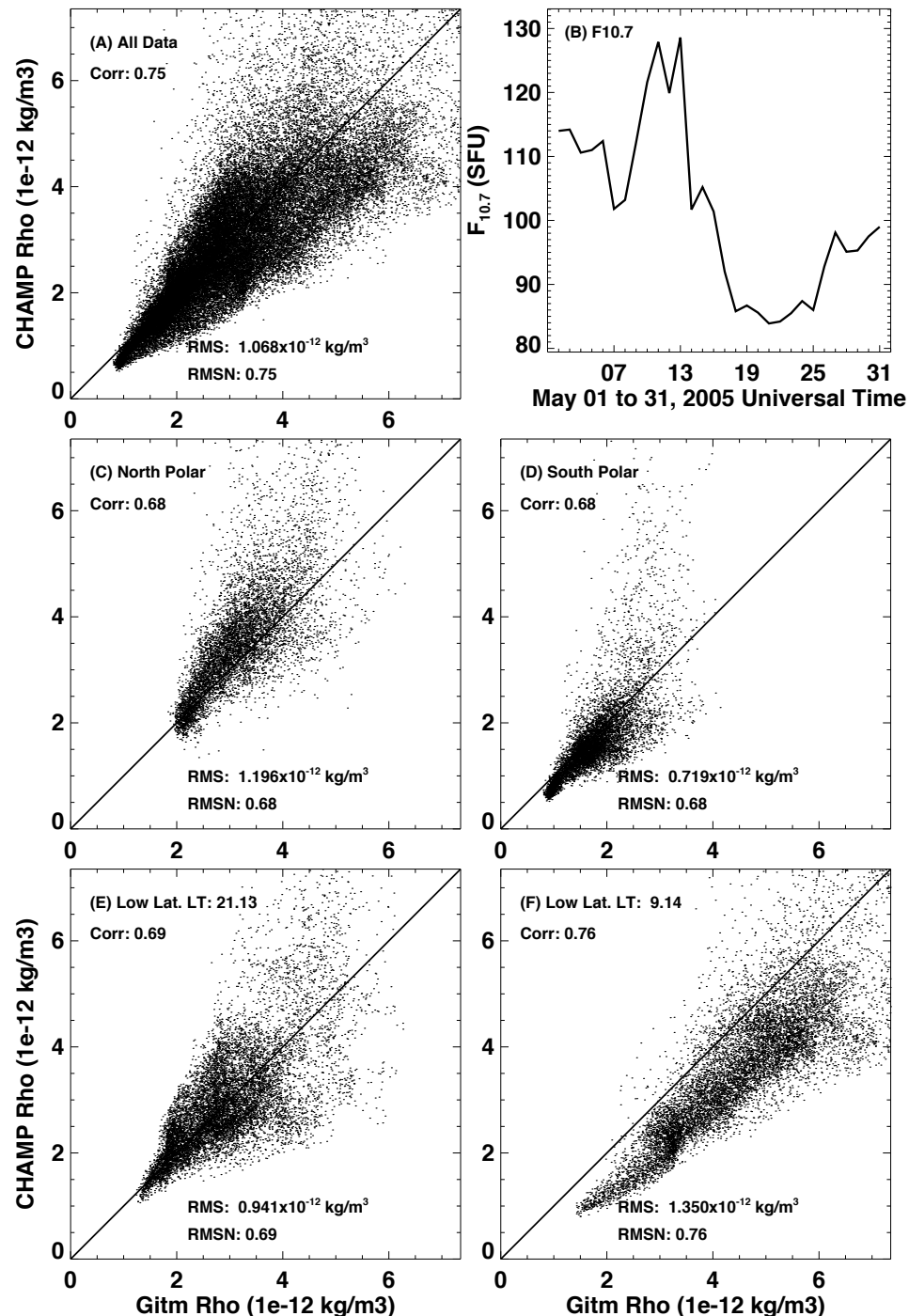


Analysis

We have been trying to figure out why GITM is sometimes biased against CHAMP data. These plots show different regions of the globe to try to isolate the causes.

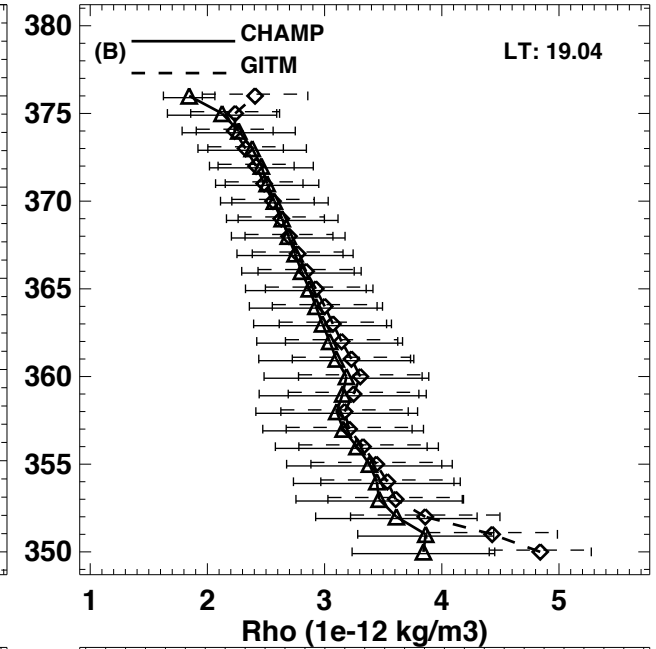
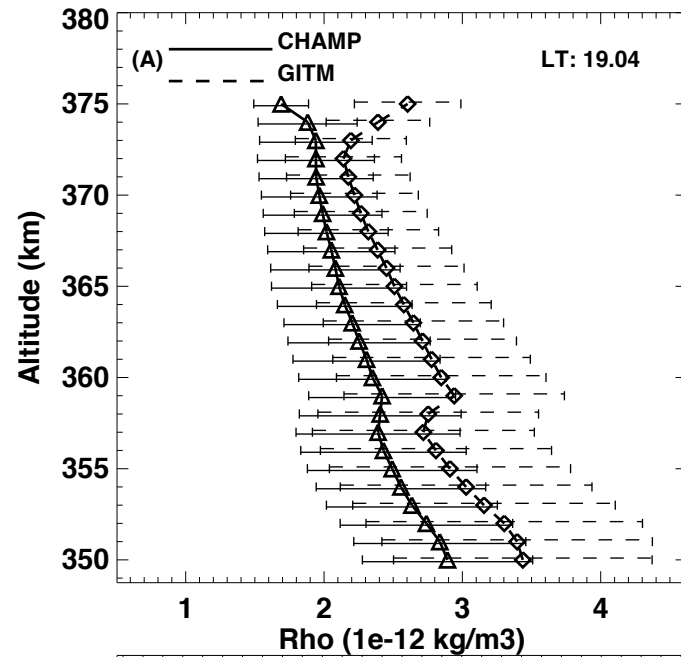
Still uncertain, but have not done rigorous analysis yet.

Looks like it might be a local time effect (around dusk GITM is typically too large)

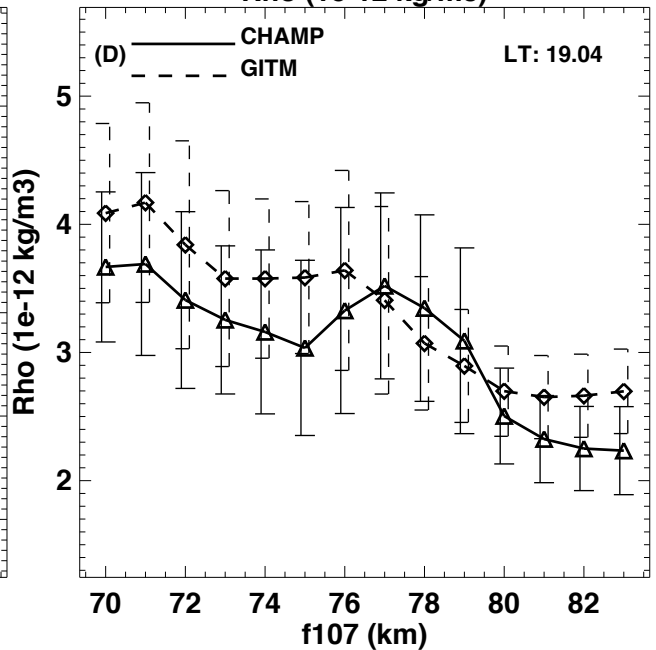
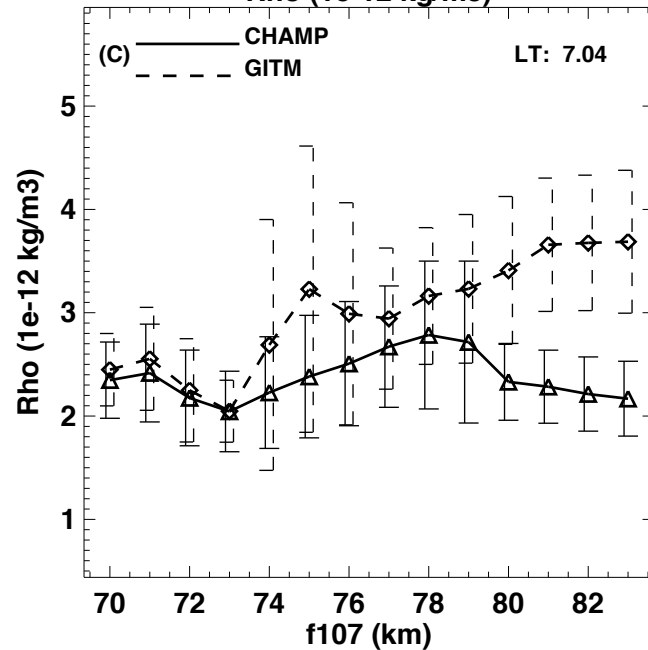


More

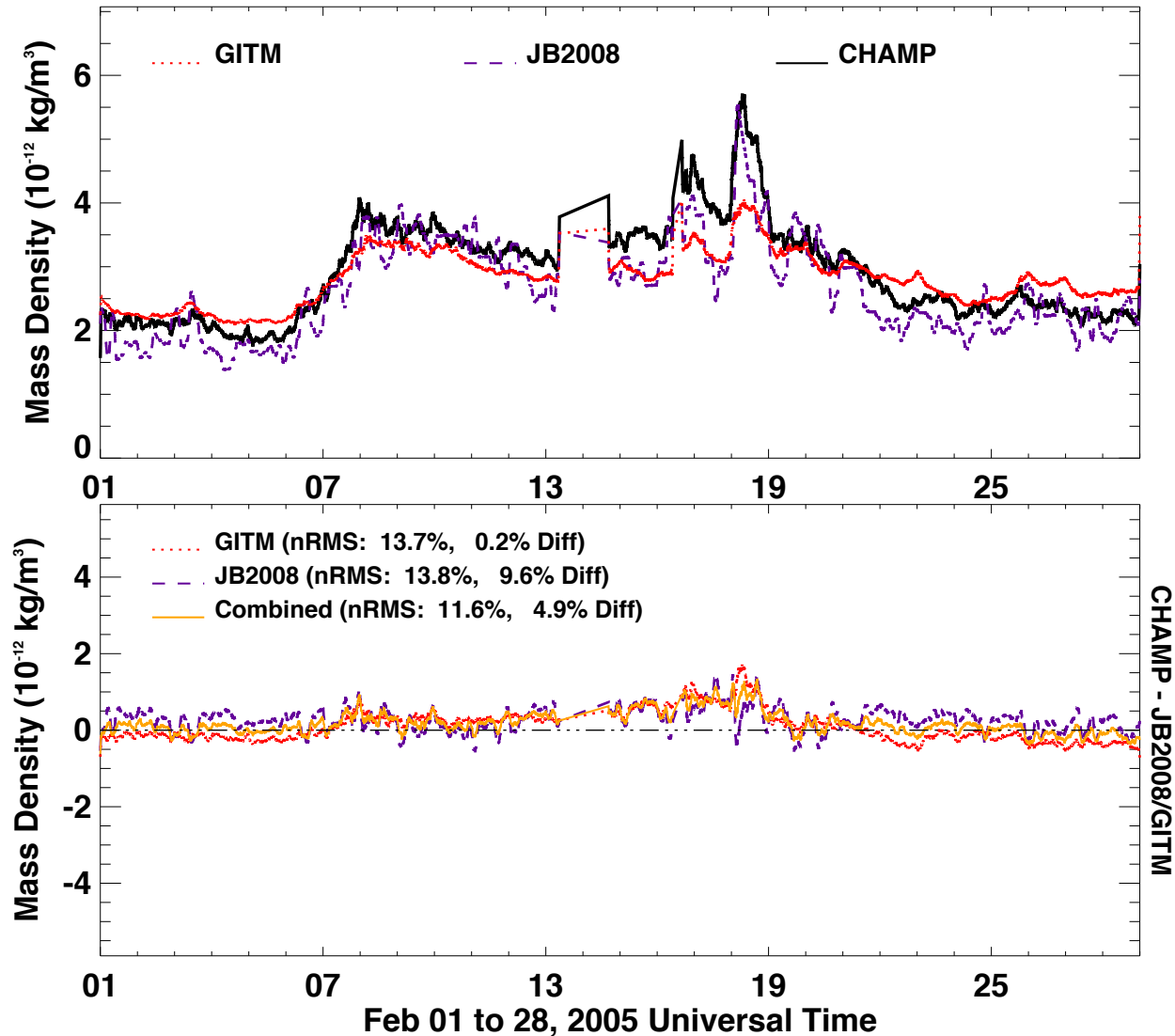
Plotted results as a function of altitude to see if scale height is different.



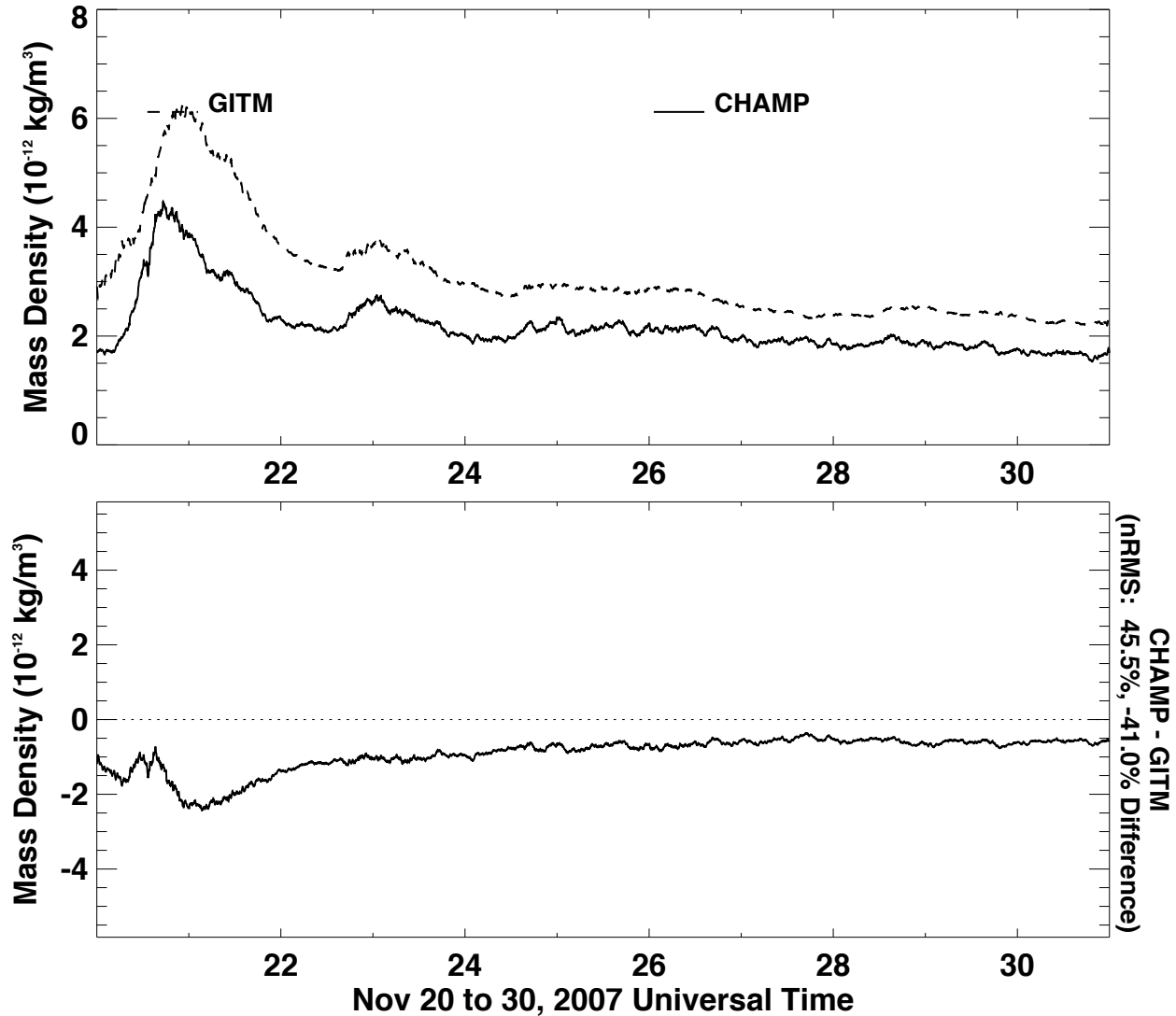
Plotted results as a function of F10.7 to see if there are differences.



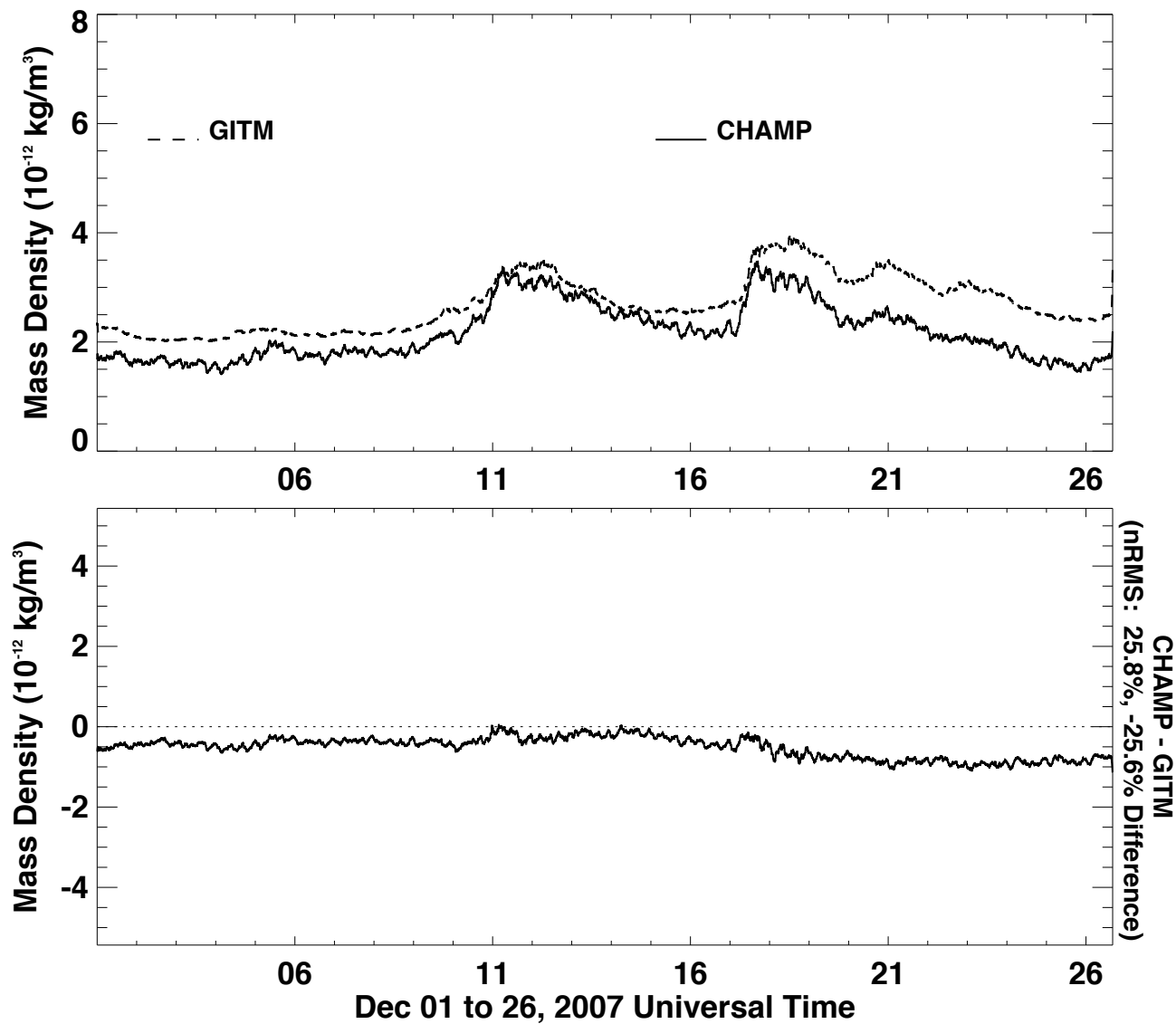
Comparison with JB2008



Barbara's Time Period (Nov.)

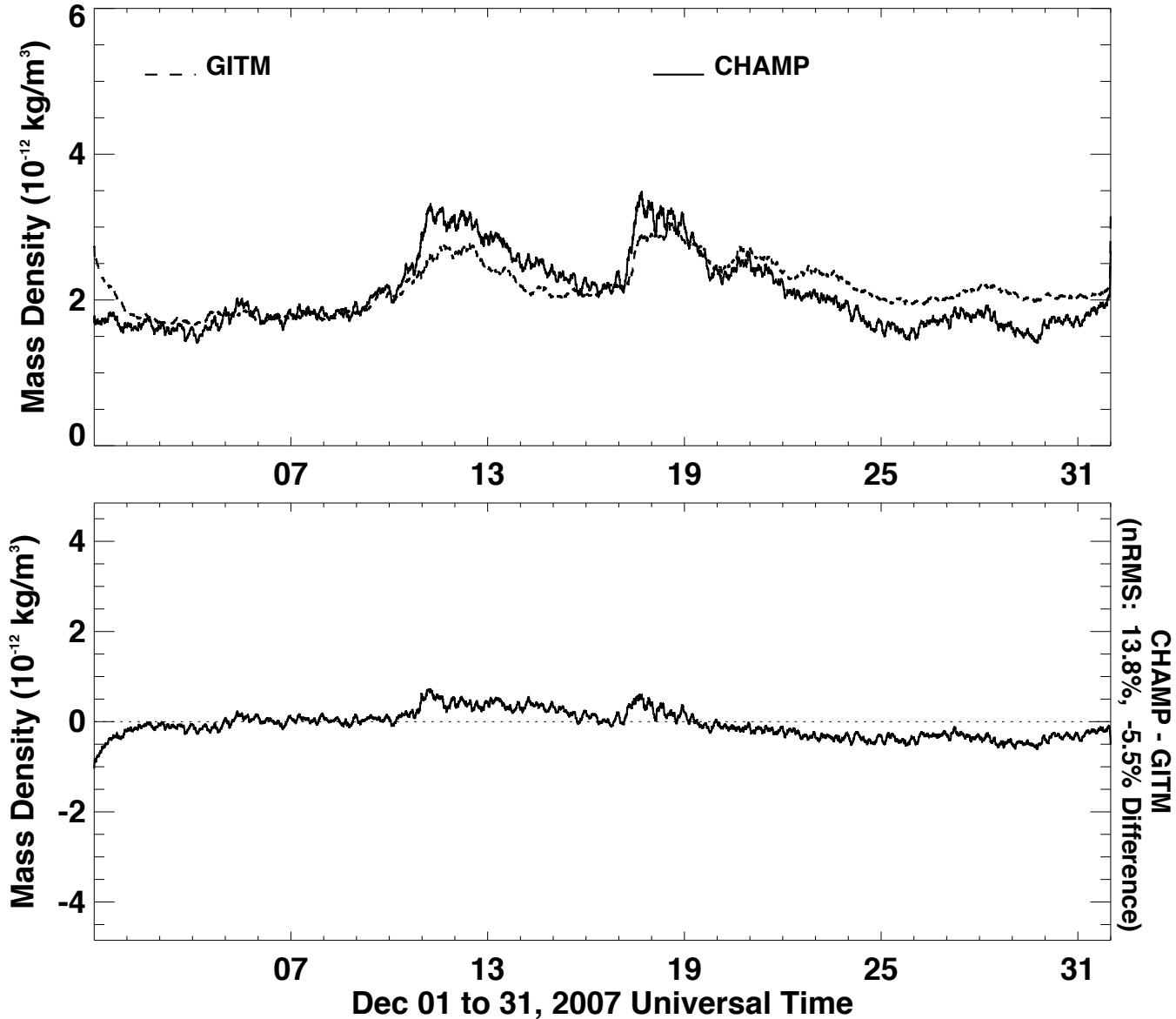


December



Old December

Initiated from Dec 1.
Why so different?



Summary

- We have made some significant progress making GITM better in the electron densities.
- We have run GITM for many years and have been comparing to CHAMP.
 - Results seem to be pretty good for the most part
 - There are times in which we have systematic bias
- Compared to JB2008, we are doing pretty well.