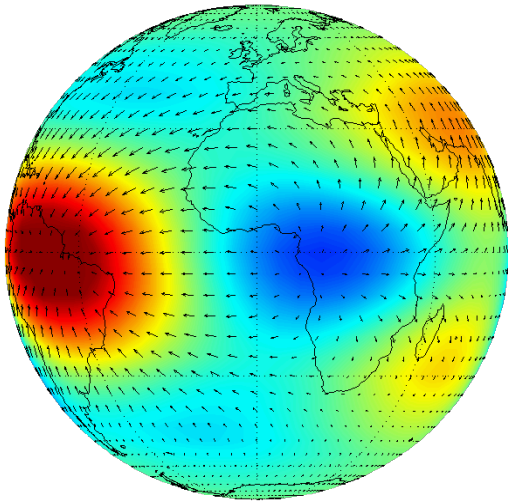


Resolving the tidal weather of the thermosphere from GDC



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Stone Gardner
Clemson University
Department of Physics

OSSE results by flying GDC through 1-hourly SD-WACCM-X simulation for 2009

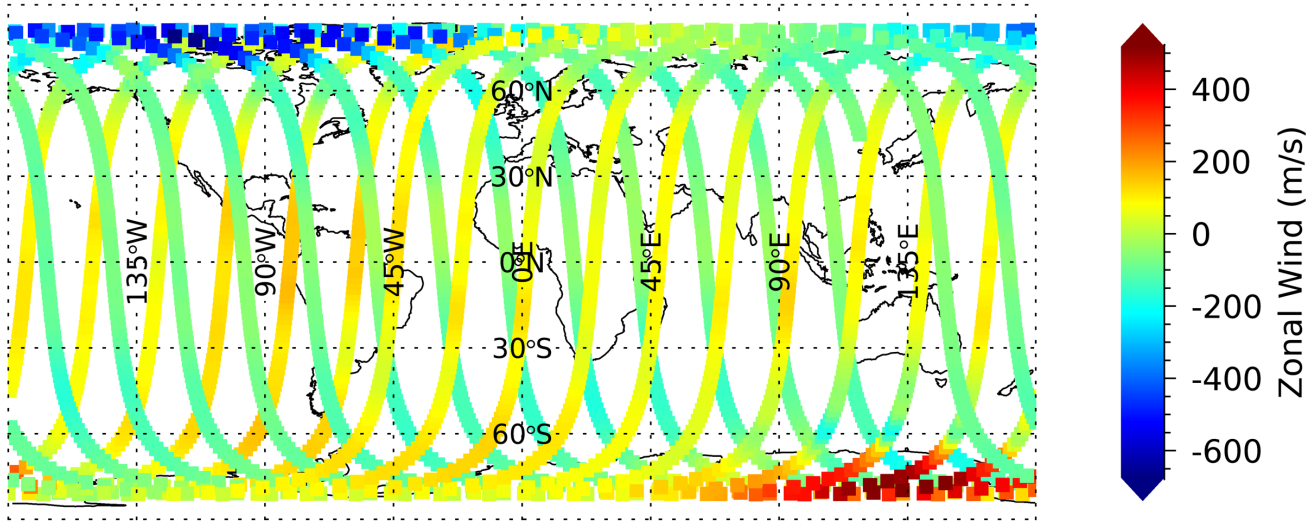
Motivation: does GDC sampling allow one to recover tides and the mean state on a daily basis?

**Current focus on GDC phase 4 towards the end of the mission
b/c of maximum local solar time spread**

**Diagnose day-to-day tidal variability of GDC-sampled model output
and compare to full model output (the “truth”)**

Mission phase 4, OSSE with 2009 SD-WACCM-X simulation (1-hr resolution)

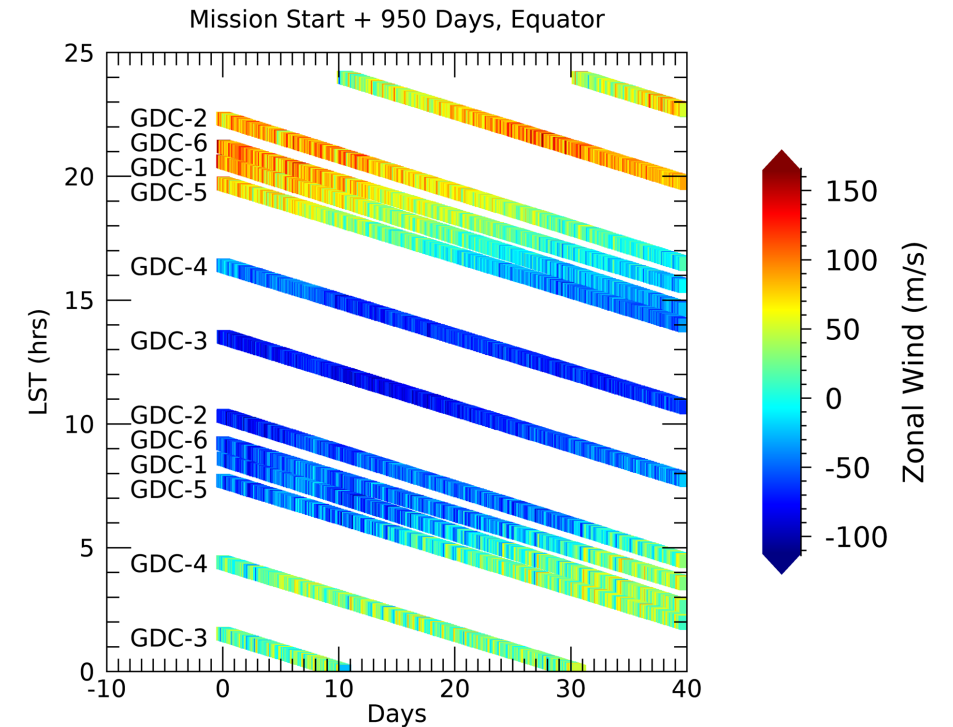
GDC-1, Mission Day 950, Phase 4



Sampled zonal wind (1 sat),
nominal mission day 950
(relative to beginning of phase 1),
Close to the end of phase 4

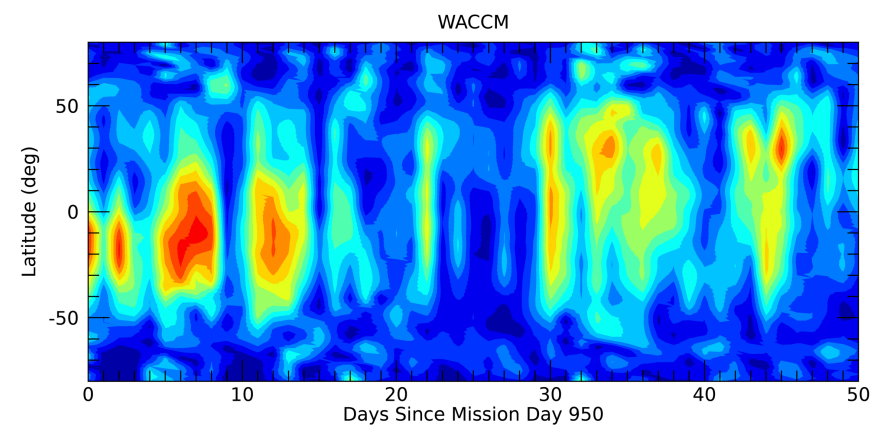
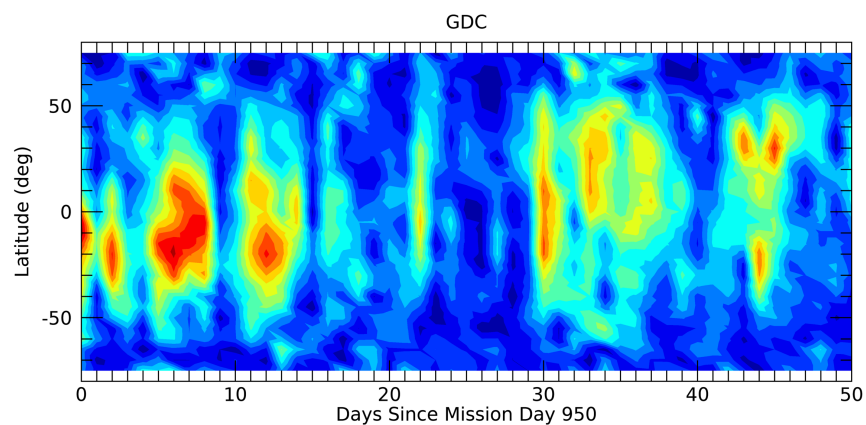
GDC local solar time (LST) coverage
based on ephemeris files

can do tidal diagnostics **every day**:
mean, diurnal & semidiurnal migrating and nonmigrating
(through binning and Fourier fits)

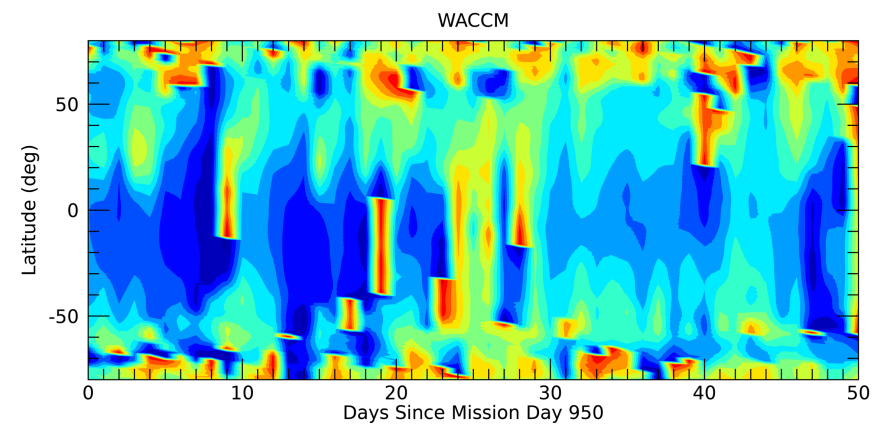
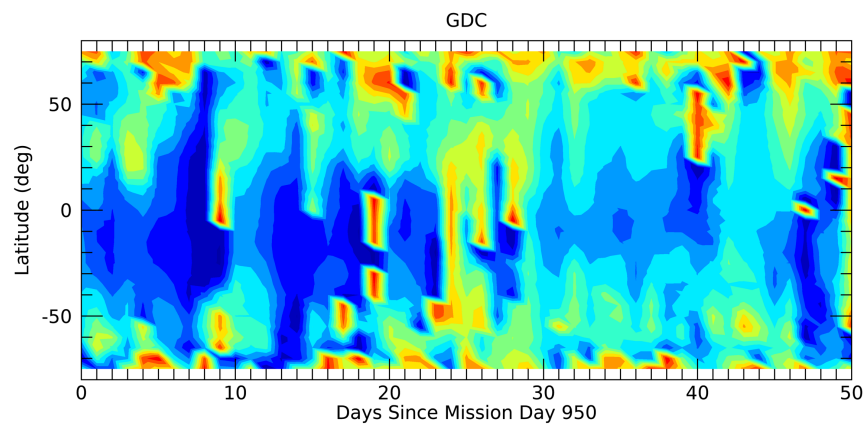


DE3 - Temperature

Amplitude



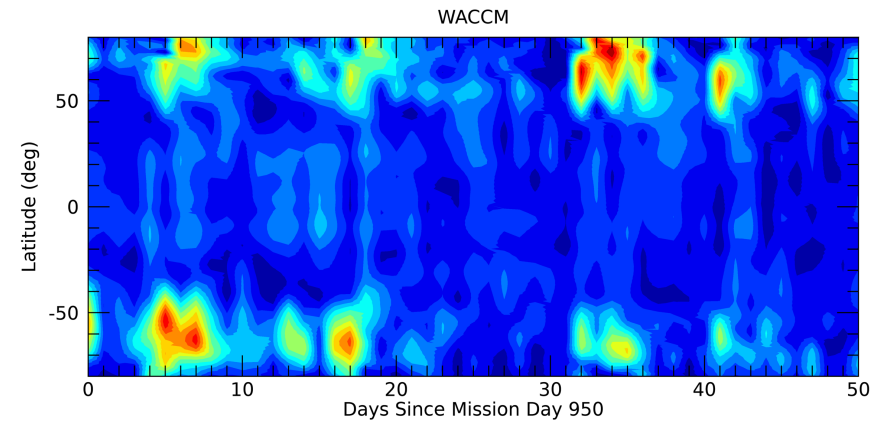
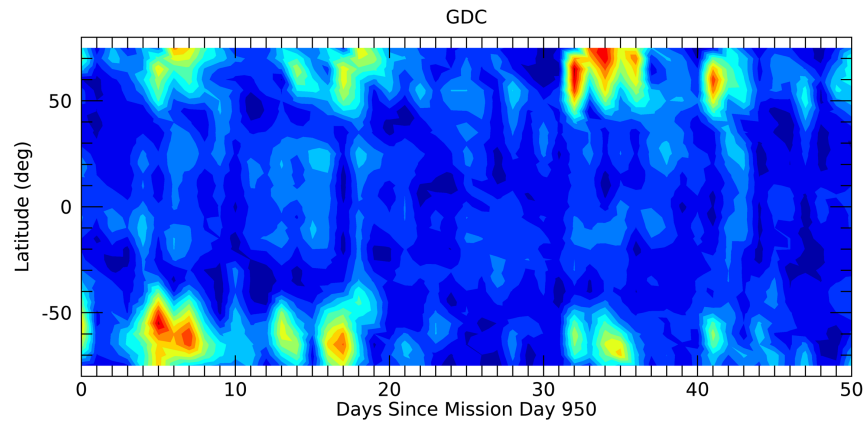
Phase



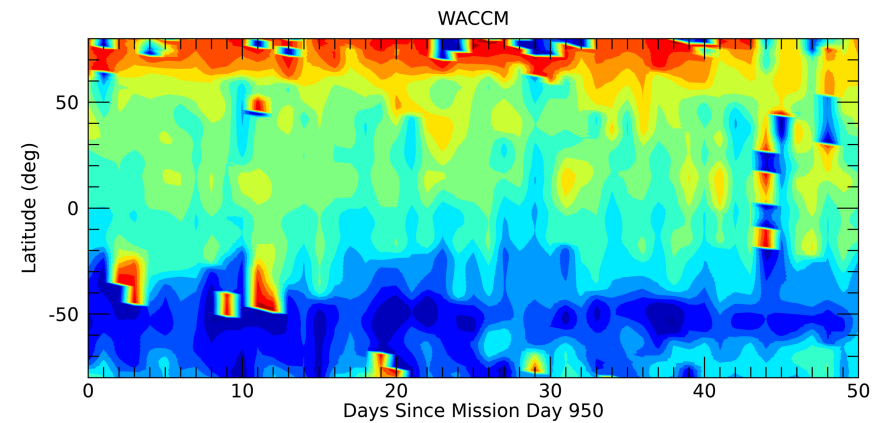
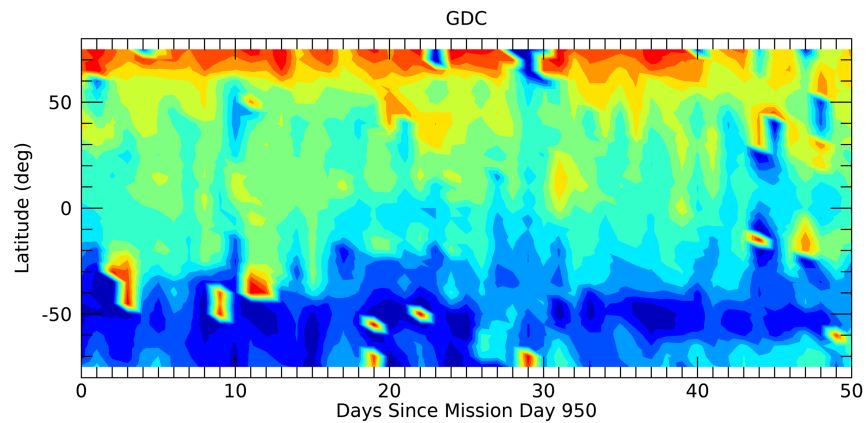
Mostly within 1 color at all latitudes, similar for wind tides; similar quality for early part of phase 4

DW2 - Temperature

Amplitude



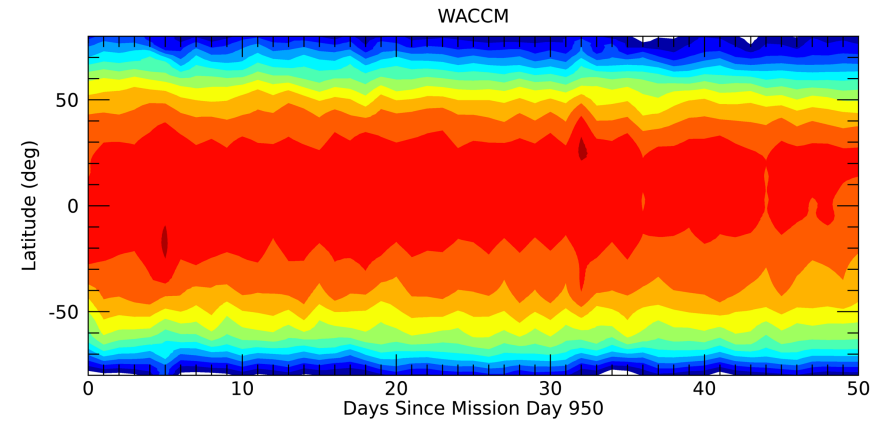
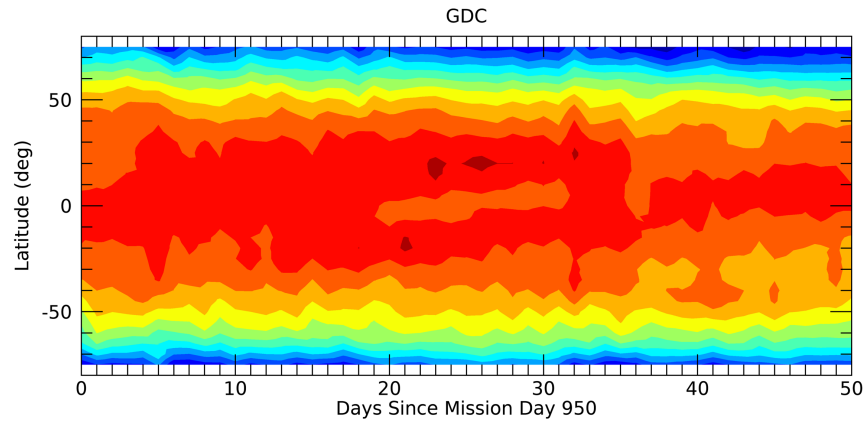
Phase



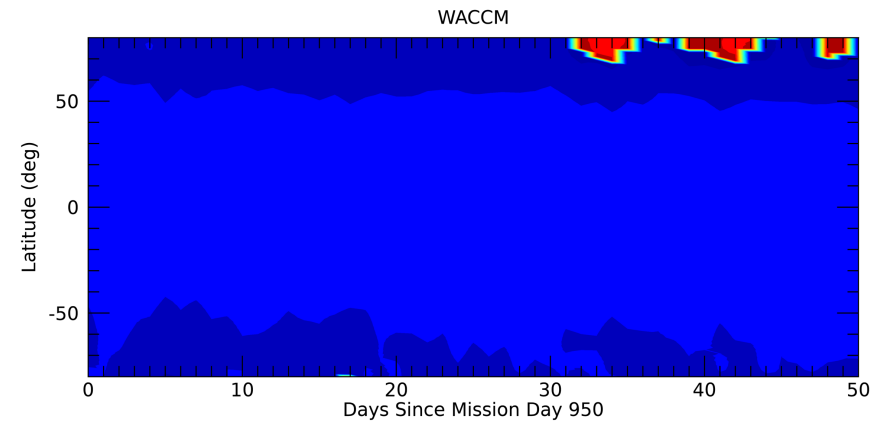
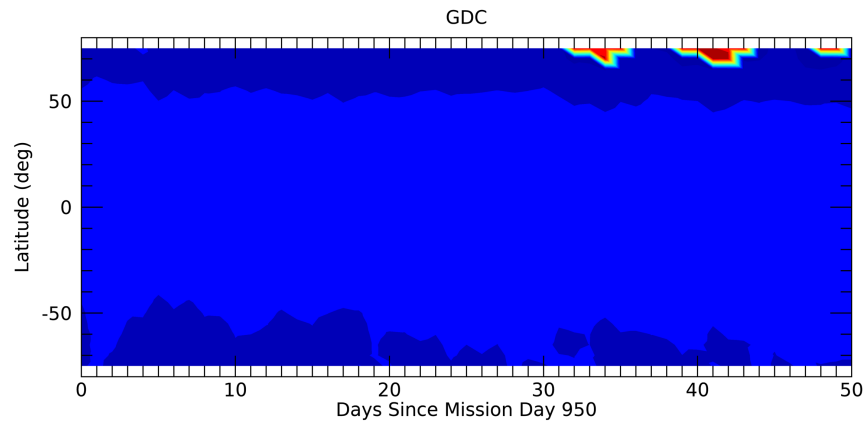
High lat tides can be recovered!!! Important for ion drag forced components.

DW1 - Temperature

Amplitude



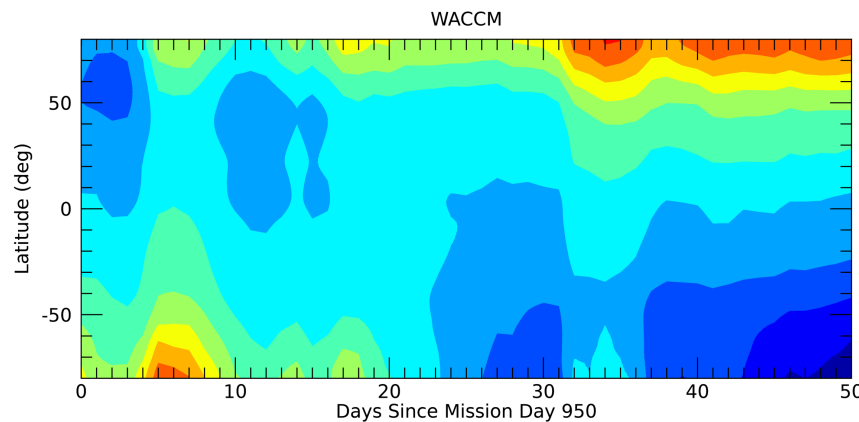
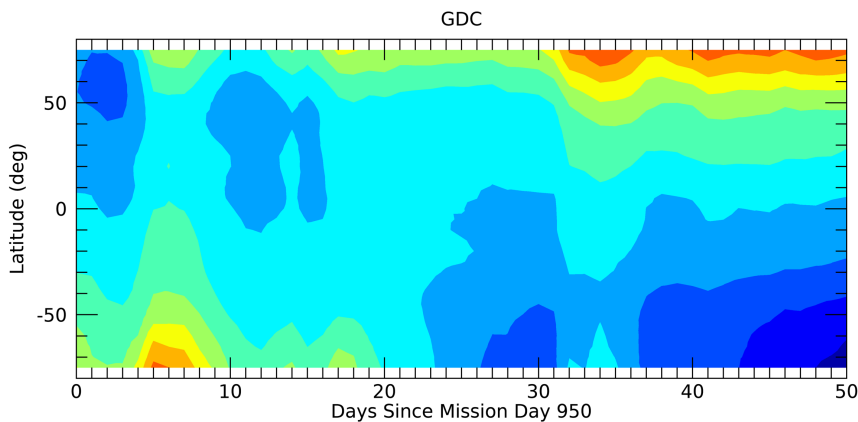
Phase



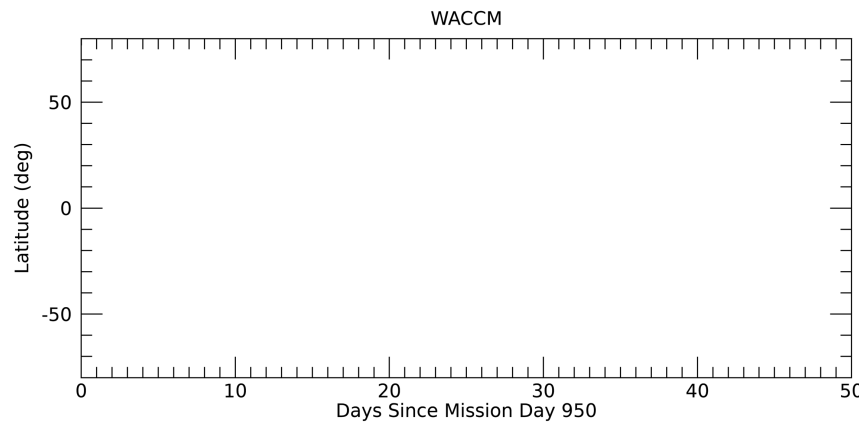
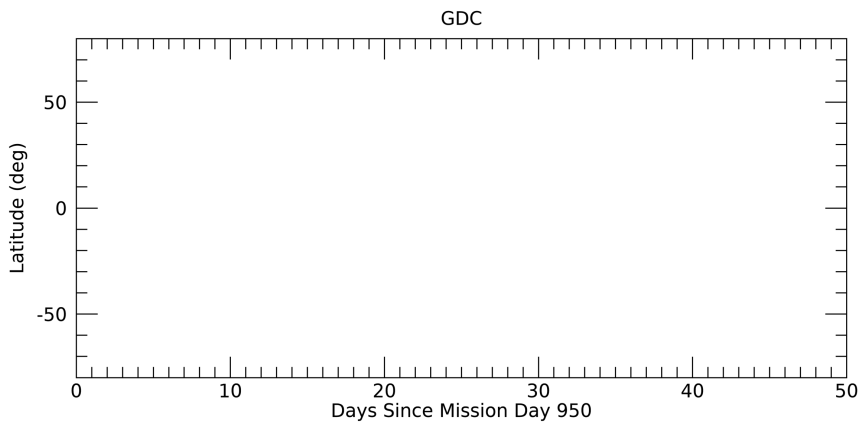
Migrating diurnal tide is recovered.

Mean - Temperature

Amplitude



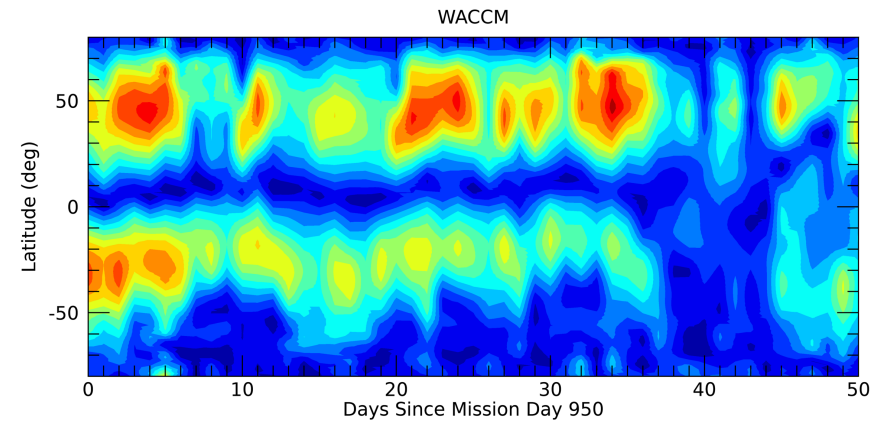
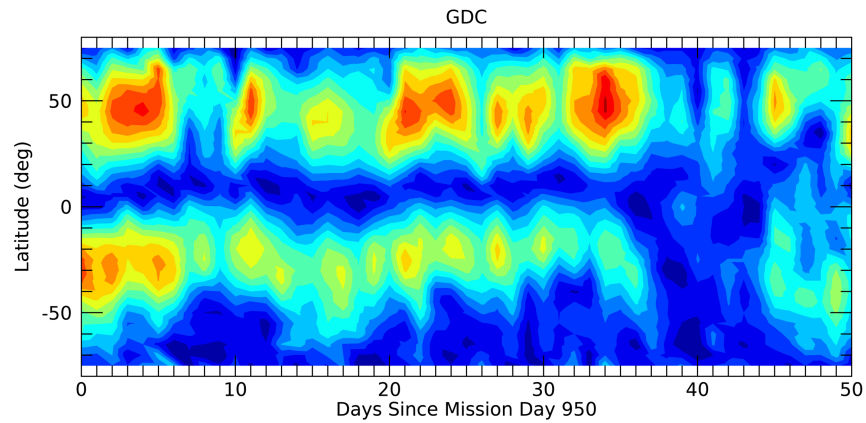
Phase



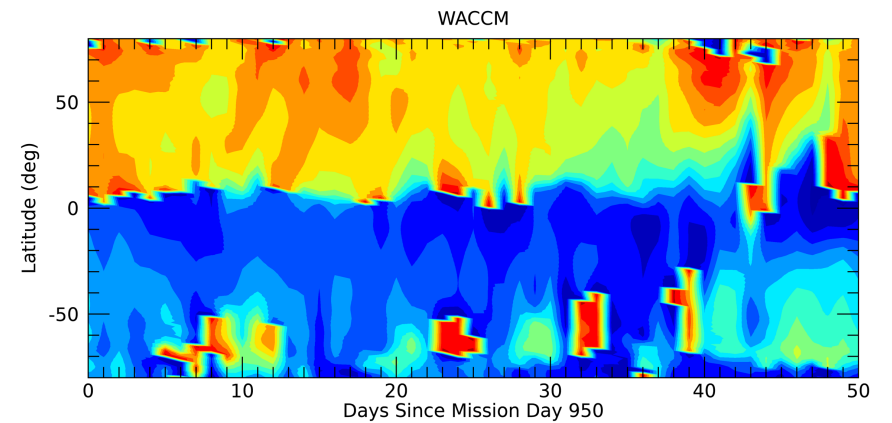
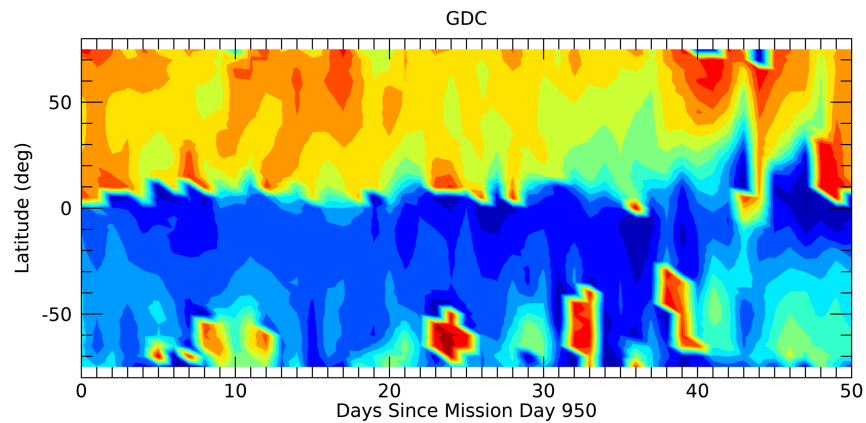
Mean state is recovered.

SE2 - Temperature

Amplitude



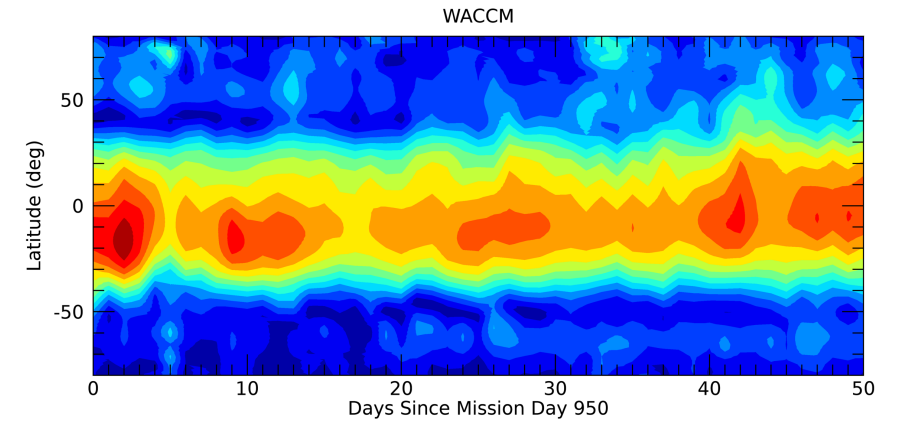
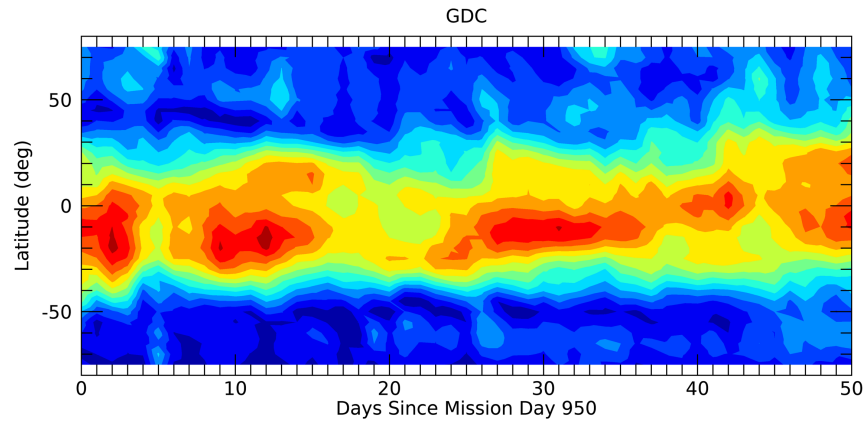
Phase



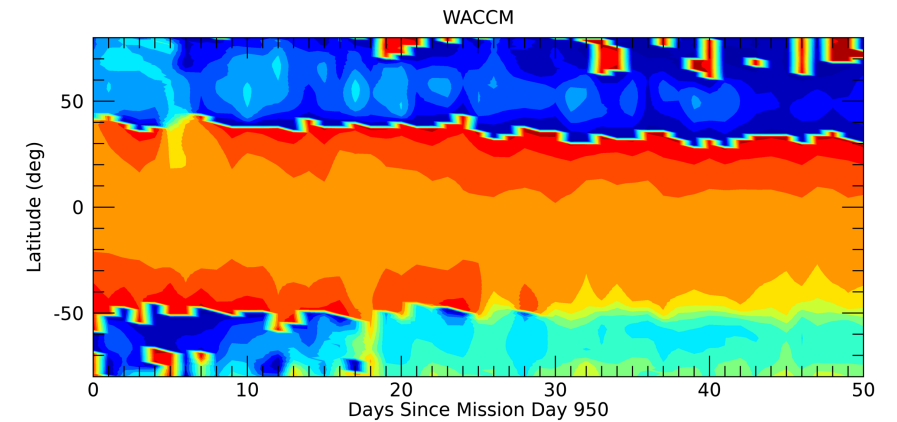
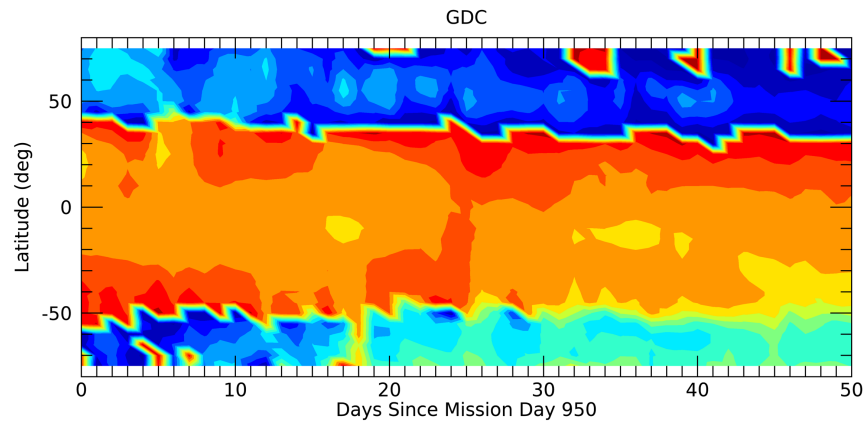
Semidiurnal nonmigrating tides are recovered.

SW2 - Temperature

Amplitude



Phase



Semidiurnal migrating tide is recovered, but with larger differences than for other components. Can probably be dealt with through some modifications in the binning that's currently being used.

Conclusion

Day-to-day tidal and mean state variability can be well recovered

in mission phase 4, including the important auroral latitudes!

diurnal & semidiurnal; migrating & nonmigrating; u , v , T

recovery throughout phase 3 possible but with reduced quality in early phase 3

**Can expect significant progress towards resolving the tidal weather
of the thermosphere from GDC**