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Summary

- WACCM-X Version 2.0 to be released soon
- Will be available from the CESM 2.0 Series Public Release webpage (www.cesm.ucar.edu/models/cesm2.0)
- Major improvements over 2012 release, including functional addition of ion transport and electrodynamics
- Multi-year simulations available
- Looking for input on future improvements
- WACCM-X Users Group session Thursday, 4 pm and www2.hao.ucar.edu/modeling/waccm-x for more details

In This WACCM-X Version

- Standard resolution: Horizontal: 1.9° x 2.5° latitude x longitude, Vertical: 1/4 scale height
- Time step: 5 minutes, ion transport and neutral dynamics sub-stepping at ~1 minute
- Te/Ti solver with thermal electron-neutral heating
- Improved hydrogen upper boundary escape flux
- Metastable O+ ions; O(3P) cooling
- Time dependent EUV solar input option
- Nighttime E-region ionization, CO2 cooling, and EUV heating fixes
- Reduced divergence damping improves tides
- Species dependent specific heat and gas constant in dynamics

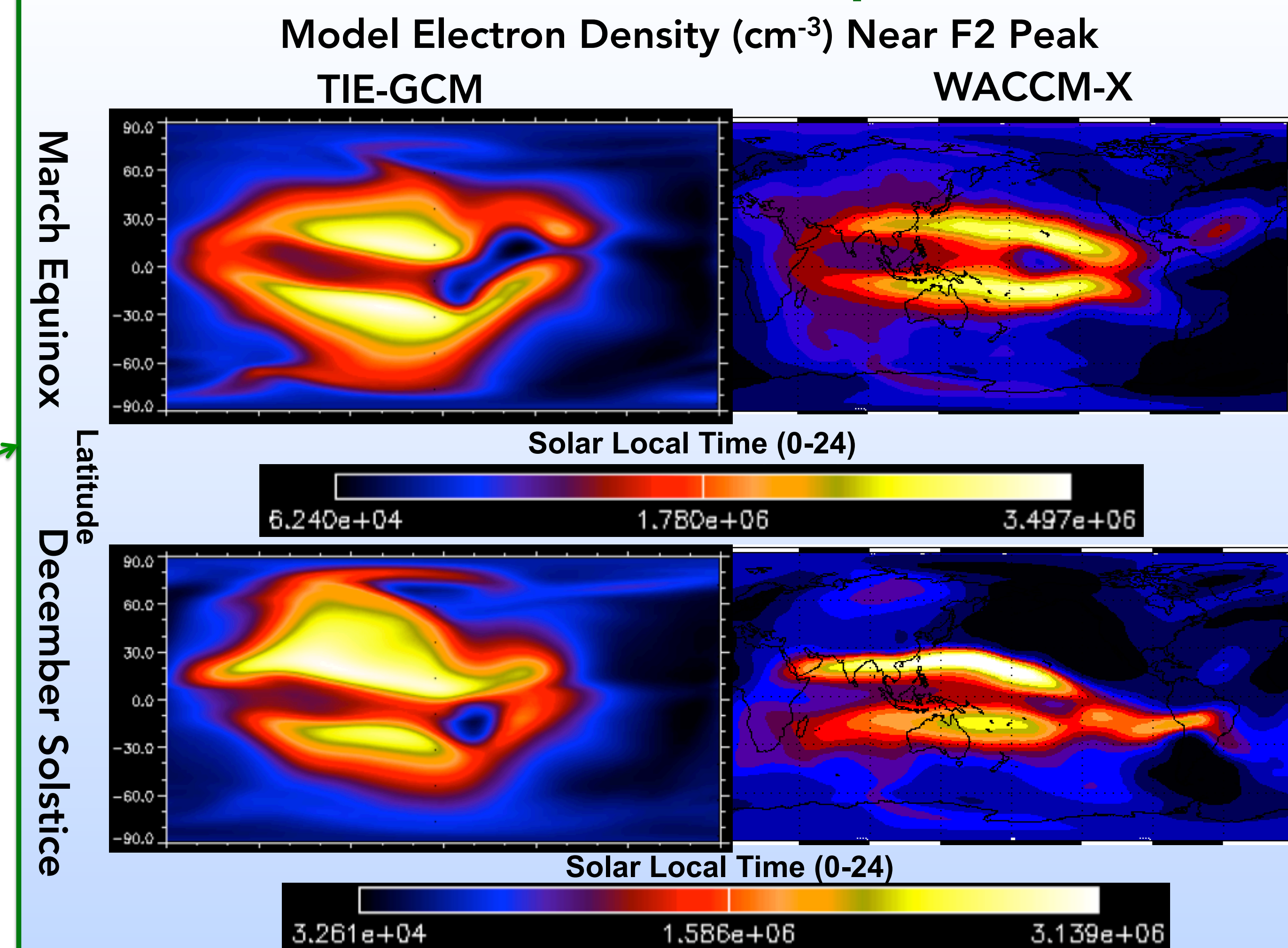
What is WACCM-X?

- The Whole Atmosphere Community Climate Model – eXtended (WACCM-X)
- Comprehensive self-consistent numerical global climate model of the Earth's atmosphere spanning a vertical range from the surface to the upper thermosphere

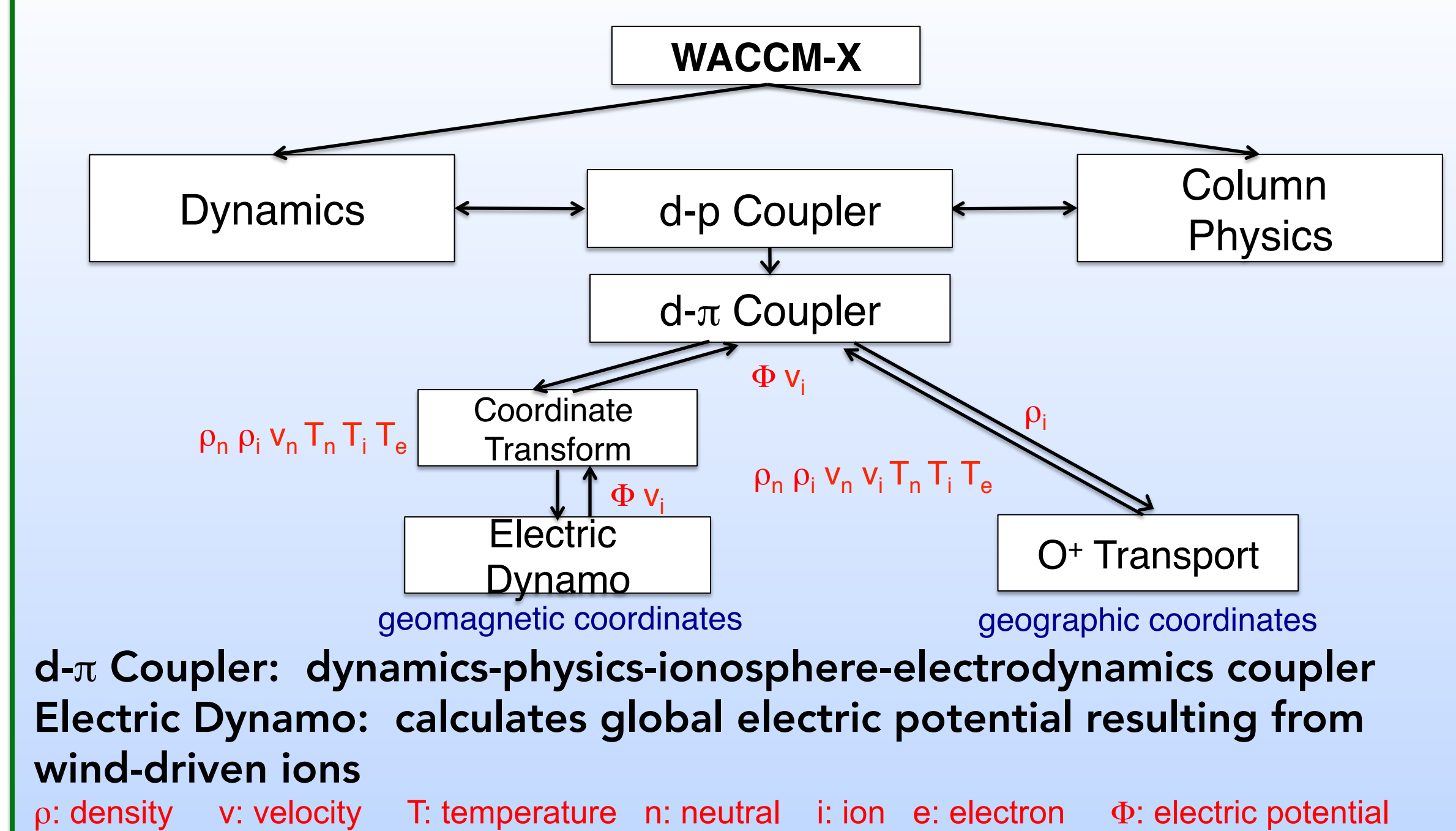
Some WACCM-X History

- Started with the Whole Atmosphere Community Climate Model (WACCM), which is based on the Community Atmosphere Model (CAM)
- Added thermosphere for Community Earth System Model (CESM) public release in 2012
- Added ion/electron transport and electrodynamics from Thermosphere Ionosphere Electroynamics – General Circulation Model (TIE-GCM) using new coupling structure
- Second release as part of CESM v2.0 in near future

Ion/Electron Transport

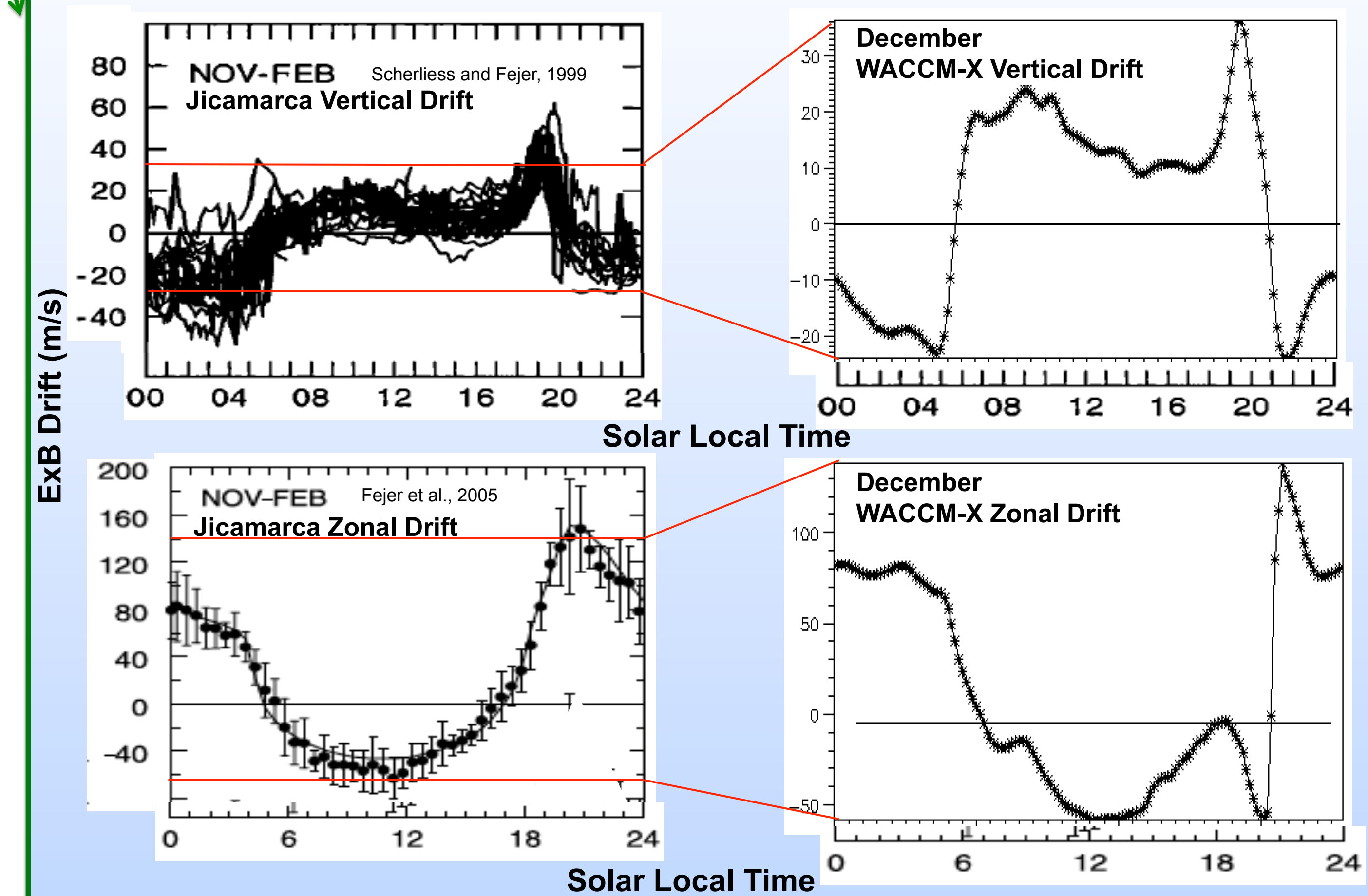


Coupler for Ion Transport/Electrodynamics



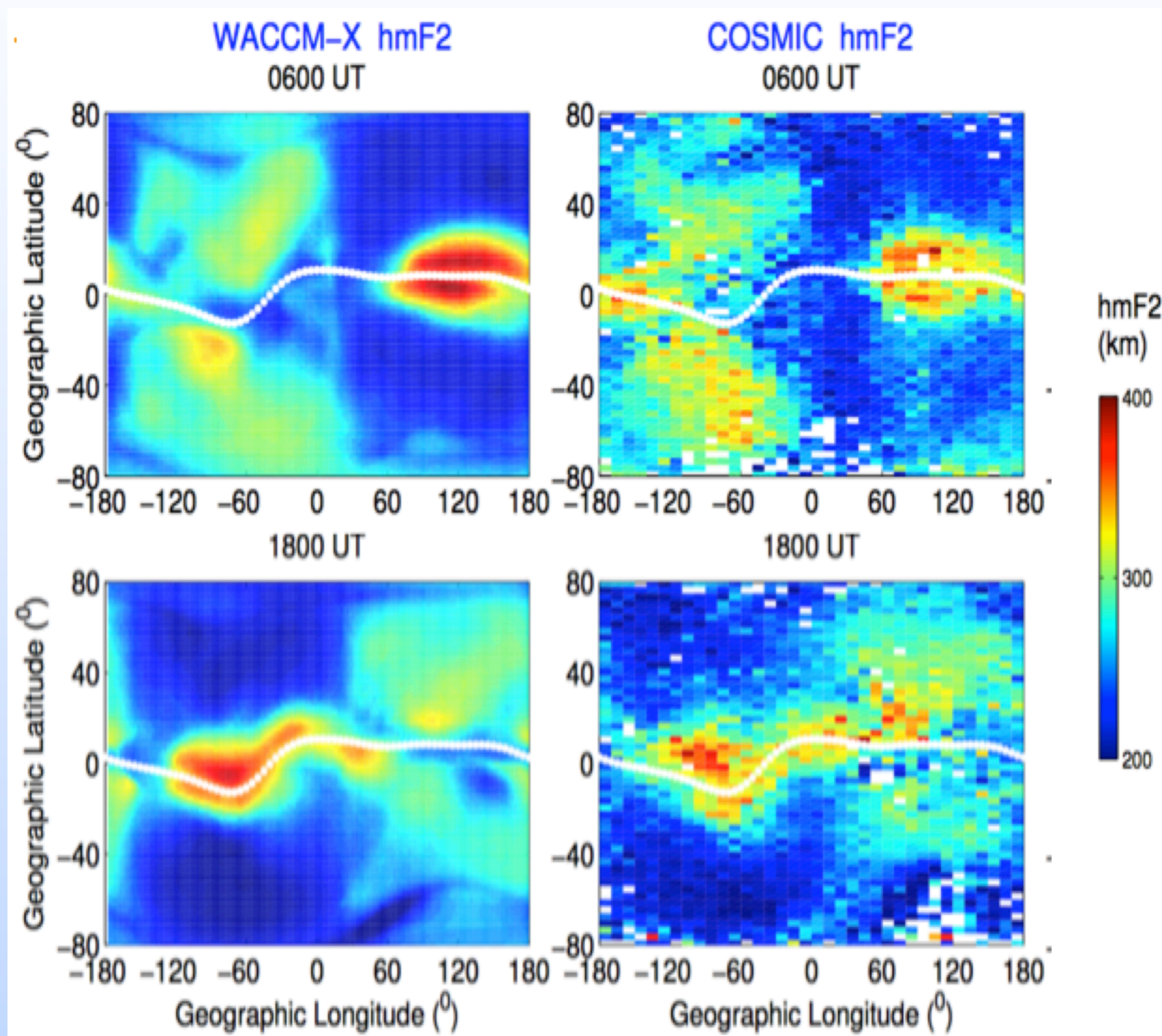
Electrodynamics

Equatorial Observed and WACCM-X ExB Drifts (Solar Maximum)



WACCM-X and COSMIC Observations

hmF2 From Jing Liu, HAO



Available Simulation Results

- Simulation using specified dynamics meteorology in the lower atmosphere 2000-2015 (FXSD configuration)
- Free running simulation 2000-2015 (FXHIST configuration)
- Constant solar condition simulations for solar minimum, medium, maximum (FX2000climo configurations)

Running WACCM-X

- Tutorial during WACCM-X Users Group session, Thursday, 4 pm
- After release, register and download CESM/WACCM-X from the model release site (www.cesm.ucar.edu/models/cesm2.0)
- Follow steps given in session tutorial using one of the configurations or compsets
- Monitored community bulletin board for help with any issues: bb.cgd.ucar.edu

Future Development

- You can help set future priorities by attending the WACCM-X Users Group session, Thursday, 4 pm
- So far, priorities are the following:
- Ion transport on geomagnetic grid
 - Plasmasphere and magnetosphere model coupling
 - New dynamical core and higher resolution
 - Data assimilation
 - AMIE and Weimer in addition to Heelis high latitudes