

ChangeLog for SVN Check-In of WACCMX Tag02 3.5.48 Tag08

Tag name: waccmx02_waccm08_cam3_5_48

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One-line Summary: Additions of ion and electron equations

Purpose of changes:

Add the ability of model to calculate electron and ion temperature as well as heating of neutral atmosphere due to collision with thermal electrons and ions.

Describe any changes made to build system:

Describe any changes made to the namelist:

List all subroutines eliminated:

List all subroutines added and what they do:

A models/atm/cam/src/physics/waccmx/ionosphere.F90

-Top level module for ionosphere calculations which includes register, init, and data init routines as well as a routine with the electron and ion equations

A models/atm/cam/src/physics/waccmx/tridag.F90

-Tridiagonal solver based on numerical recipes algorithm used in solving electron heat conduction equation.

List all existing files that have been modified, and describe the changes:

The following module has been modified for all CAM/WACCM/WACCMX run modes:

M models/atm/cam/src/chemistry/waccm_mozart/mo_jshort.F90

- fixed bug in slant_col (setting scale height for extended model and bug in column increment calculation) and calc_o2srb (filling edge of table values) routines

The following modules have been modified for WACCMX run mode only:

M models/atm/cam/src/chemistry/waccm_mozart/chemistry.F90

- added pbuf declaration which is used in call to initindx.F90 (physics/cam)
- added ionosphere use statement and call to ionosphere_register routine
M models/atm/cam/src/physics/cam/initindx.F90
-added ionosphere use statement and call to ionosphere register routine
M models/atm/cam/src/chemistry/waccm_mozart/iondrag.F90
- added implicit none
- added declarations of indices to access pbuf variables Pedersen and Hall Conductivity as well as assignments of these variables to the pbuf structure
M models/atm/cam/src/chemistry/waccm_mozart/mo_aurora.F90
- added use and declaration of pbuf physics buffer structure
- added declaration of index to access auroral ion production rate sum in pbuf
- added assignment of auroral ion production rate sum in pbuf
M models/atm/cam/src/chemistry/waccm_mozart/mo_gas_phase_chemdr.F90
- added declaration of pbuf as 'inout' instead of just 'in'
- added pbuf to call of waccm_photo routine
M models/atm/cam/src/chemistry/waccm_mozart/mo_waccm_photo.F90
- added maximum zenith angle for extended model
- added pbuf to call of waccm_photo routine
- added use statements declarations for variables needed to access ion rates in pbuf structure
- added declaration of local ion rates array assignment to pbuf structure variable
M models/atm/cam/src/physics/cam/physpkg.F90
- added use statements for ionosphere and phys_buffer modules
- added call to ionos_init routine
M models/atm/cam/src/physics/cam/tphysac.F90
- added use statement for ionosphere module ionos_intr routine
- added call to ionos_intr routine