

Description and Public Release of WACCM3

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Outline

- Basic info about WACCM3
 - Differences from WACCM1b & CAM3
- How to get WACCM3
- Support
- Open Questions



WACCM3

- Whole Atmosphere Community Climate Model, Version 3
- Science Goals:
 - Stratospheric Ozone
 - Sun-Earth Connections
- Collaboration among:
 - CGD
 - HAO
 - ACD

WACCM3 DESCRIPTION

MODEL Framework	Dynamics	Tracer Advection	Resolution	Chemistry	Other Processes
Extension of the NCAR Community Atmosphere Model version 3 (CAM3) Based upon CAM3.1.9	Finite Volume Dynamical Core (Lin, 2004) Fully-interactive, i.e., consistent with model derived: O ₃ , CO ₂ , CH ₄ , N ₂ O, H ₂ O, CFC-11, CFC-12, O ₂ , NO.	Flux Form Finite Volume (Lin, 2004)	Horizontal: 1.9° x 2.5° or 4.0° x 5.0° (lat x lon) Vertical: 66 levels 0-140km <ul style="list-style-type: none"> • < 1.0km in UTLS • 1-2 km in strat. • 3 km in M/LT 	Middle Atmosphere Mechanism <ul style="list-style-type: none"> •57 Species including Ox, HOx, NOx, BrOx, and ClOx •No NMHCs •Includes Het. Chemistry on LBS, STS, NAT, ICE •E-region Ion Chemistry 	<ul style="list-style-type: none"> •GW Param. Internal and Orographically-generated •Molecular Diffusion Banks and Kockarts, 1973 •Auroral processes, inc. ion drag, and Joule heating •Long-, short-wave, chemical potential heating

WACCM3 Chemical Constituents

Long-lived Species: (17-species)

Misc: CO_2 , CO , CH_4 , H_2O , N_2O , H_2 , O_2

CFCs: CCl_4 , CFC-11, CFC-12, CFC-113

HCFCs: HCFC-22

Chlorocarbons: CH_3Cl , CH_3CCl_3 ,

Bromocarbons: CH_3Br

Halons: H-1211, H-1301

Constant Species: N_2

Short-lived Species: (34 neutrals + 5 ions + electrons)

O_x : O_3 , O , $\text{O}(^1\text{D})$

NO_x : N , NO , NO_2 , NO_3 , N_2O_5 , HNO_3 , HO_2NO_2

ClO_x : Cl , ClO , Cl_2O_2 , OCIO , HOCl , HCl , ClONO_2 , Cl_2

BrO_x : Br , BrO , HOBr , HBr , BrCl , BrONO_2

HO_x : H , OH , HO_2 , H_2O_2

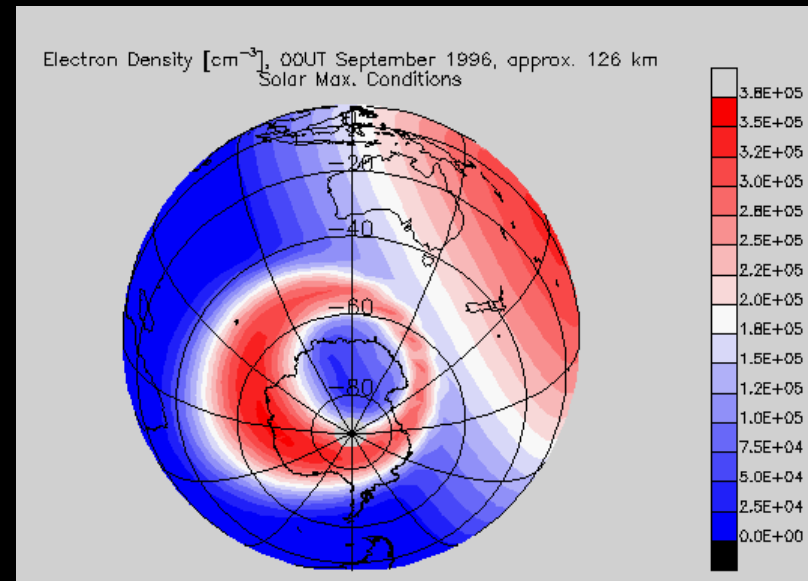
HC Species: CH_2O , CH_3O_2 , CH_3OOH

Ions: N^+ , N_2^+ , NO^+ , O^+ , O_2^+

Other: $\text{O}_2(^1\Sigma)$, $\text{O}_2(^1\Delta)$, $\text{N}(^2\text{D})$, e

WACCM3 changes

- WACCM-3 merged with the Community Atmosphere Model (CAM_3.1.9)
- Processes now dealt with in a self-consistent manner in WACCM:
 - Solar variability
 - Chemical heating
 - Airglow
 - Ion chemistry (5 ions & electrons)
 - EUV and x-ray ionization
 - Auroral processes
 - Particle precipitation
 - Ion drag
 - Joule heating
- WACCM1b: chemistry not interactive
 - Radiation sees specified O₃, CH₄ etc.
 - Used to look a Middle Atmosphere Dynamics
 - WACCM1b is available through community data portal



More Info

- WACCM3 is documented
- Used for 2006 WMO Assessment
 - Several hundred years of simulation available

References, details:

- <http://waccm.acd.ucar.edu/index.shtml>

Downloads:

- <http://waccm.acd.ucar.edu/Downloads/index.shtml>

Release

- Model will be available through the Community Data Portal (same as CCSM)
<http://cdp.ucar.edu> (search for WACCM)
 - Source Code
 - Input data sets
 - Documentation
 - Run scripts for NCAR IBMs
- Register, download. No approval necessary
- Status: Almost done
 - Getting version in order & Testing



CDP: WACCM-1b source code distribution

http://cdp.ucar.edu/browse/browse.htm?url=http://dataportal.ucar.edu/metadata/waccm/WACCM1b_dist/WACCM1b

ANDREW Bookmarks

Community Data Portal

NCAR | CISL

CDP Home Applications Support Login

UCAR

WACCM-1b source code distribution

Creator: UCAR/NCAR/ACD > Atmospheric Chemistry Division, National Center for Atmospheric Research, University Corporation for Atmospheric Research [contact email: acd AT ucar.edu] [[web page](#)]

Creator: UCAR/NCAR/CGD > Climate and Global Dynamics Division, National Center for Atmospheric Research, University Corporation for Atmospheric Research [contact email: cgd AT ucar.edu] [[web page](#)]

Creator: UCAR/NCAR/HAO > High Altitude Observatory, National Center for Atmospheric Research, University Corporation for Atmospheric Research [contact email: hao AT ucar.edu] [[web page](#)]

Publisher: UCAR/NCAR/CDP > Community Data Portal, National Center for Atmospheric Research, University Corporation for Atmospheric Research [contact email: cdp AT ucar.edu] [[web page](#)]

Project: WACCM > Whole-Atmosphere Community Climate Model

Summary: gzipped tar files containing the complete source code for waccm1, version b (waccm1b), and the initial condition and boundary datasets

Show Additional Collection Information

File-level access

You may either download a file by clicking on it (hyperlink in the first column, if available), or add files to your **Data Cart** to prepare a multi-files request.

1-2 of 2 datafiles

start from file #: +1 and display files per page (max:100) (NEW: optional filename match:)

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1. WACCM-1b source code				2732818	<input type="checkbox"/> download	
2. WACCM-1b initial and boundary datasets				95120092	<input type="checkbox"/> download	

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Portal Software Version 4.4 © UCAR, all rights reserved.

NCAR Community Data Portal, sponsored by National Science Foundation

Support

- WACCM has no community support resources
 - WACCM is part of CCSM. If you have trouble with getting the model running, start with getting CAM running and get support with that.
- Support for WACCM3 is voluntary, through CCSM bulletin boards:
 - <http://bb.cgd.ucar.edu>
- We'll see how it goes
 - Not committing to anything, but willing to help users we are collaborating with

ANDREW Bookmarks





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Forum	Last Post	Threads	Posts
Community Climate System Model			
 CCSM Announcements	 bulletin boards restored by mvr 10-18-2006 03:12 PM	7	8
 CCSM Bug reporting	 configure generate_batch error by odden 05-27-2008 04:06 PM	34	83
 CCSM Input Data inquiries (1 Viewing)	 Restart files by karthik23 06-06-2008 10:31 AM	40	94
 CCSM Output Data inquiries	 About CAM output file... by suvarchal 05-14-2008 03:56 AM	46	122
 CCSM Software Development Includes issues for building/running on supported machines and porting to unsupported machines	 mpirun doesn't recognize the... by ptaylor 06-06-2008 12:46 PM	80	226
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 Subversion Issues Forum for issues related to the new version control system	 Subversion integration with... by rneale 11-07-2007 04:02 PM	7	13

Future Development

- WACCM3.5 nearly final
 - For 2010-2011 WMO Ozone assessment
 - Freeze and run this year
 - Based on CAM3.5 (3.5.47)
 - Updated WACCM code
 - GW, Aero Heating, Chemical Rates
 - Code a branch in CCSM code repository
- WACCM code is in main CAM trunk
- WACCM3.5 uses CCSM4alpha structure
 - Will make it easy to move to CAM4/WACCM4