Impressions of WACCM from the Outside

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Experiments

- Download WACCM to local computer and try to run it.
  - Mac OSX running MPI, NAG Fortran Compiler
- Download WACCM to NASA computer and try to run it.
  - Pleiades using iFort
- These experiments were done by Dave Pawlowski, who has had years of experience running under both environments and running complex codes.

Mac OSX

- Downloaded wa319_14.model.tar.gz and wa319_14_mac.tar from board.
- Run make_waccm
  - Permission denied. chmod…
- Again
  - Failed
  - Need to change lots of things in make_waccm.sh
    - lib_netcdf
    - inc_netcdf
    - inc_mpi
    - lib_mpi
    - user_fc

Mac OSX cont.

- Run again
  - Configure successful
  - Build fail
    - MAKE.out shows that gmake is not found – changed to make
    - Can you put MAKE.out in root directory instead of buried down three levels?
- Again
  - Srcfiles directory doesn't exist
  - Where is makefile?
  - Figured out that the makefile is recreated during the make_waccm process each time
    - Not really clear
    - Need to find default makefile
  - Eventually – just ignore error.

Mac OSX cont.

- Failed
  - WACCM/cam3_1_9_brnchT_waccm_14/models/utils/esmf/build//base doesn't exist
  - Because the scripts/makefile don't recognize the compiler, this is wrong
  - Should have some predefined "unknown" settings?
  - No idea what the settings for different compilers should be…

- Code dies trying to build esmf
  - Hack esmf makefile to set ESMF_ARCH to Darwin_intel

- Lots of errors this time.
  - couldn't run '/usr/bin/i686-apple-darwin9-gcc--c': No such file or directory
  - Ignore
  - Build dies because ifort: command not found
  - Must set compiler again in esmf makefile
    - base_variables include file

Mac OSX cont

- Failed
  - WACCM/cam3_1_9_brnchT_waccm_14/models/utils/esmf/src/Infrastructure/ BasicUtil/ESMF_BasicUtilMod.F for a specific f95 thing (add –kind=byte)
- Lots of "library has no symbols"….
- MPI related errors next:
  - .F90 files are not being preprocessed
  - Need to add stuff in cam makefile under darwin
  - Hack makefile to use cpp for preprocessor
- misc.h file not found
  - Had to hack in an additional –I/Users/…. To point to the correct directory.
- Fatal Error: time_manager.f90, line 10: Cannot fine module ESMF_TIMEMGMTMOD ….
- Give up.

Mac OSX cont.

- This experiment took Dave three days. I helped him a tiny bit, and Darren De Zeeuw (who wrote BATSRUS) helped him for a few hours

- Called and talked to NCAR people for a while

- Used message board a bit

- Recommendations:
  - README file should have some helpful hints about where things are defined incase you run into problems
  - Should have some generic settings
  - Could download to a wider variety of computers and try to get it to work
    - Notes on how users/developers got the code to work on different platforms to give new people a place to start
  - Make sure that all makefiles use same settings
  - Make is easier? I don't know.

SWMF Makefiles

- SWMF has 12 sub-models.
- We have a main Makefile in the root directory.
  - Includes a Makefile.conf (compilers and flags) and Makefile.def (directories and such)
  - These are used by every makefile in the sub directories
- Config.pl
  - Figures out what machine you are on and copies correct makefiles and MPI header files
  - If the MPI header is not correct, SWMF handles this badly
  - One preprocessed code; sort of handled badly
- If you can figure out the MPI header and the single preprocessed code (hack it), compilation is typically easy.

Pleiades

- Downloaded web version of the code
- Altered netcdf, mpi libraries and ifort compiler
  - Since people have run on this computer, could add these options to configure script?
- Build successful!
- README says copy scripts/run directory – doesn't exist
  - Copied Aimee Merkel's run directory
  - Learned to do this over the phone
- Some files included in run directory and in Mac tarball, but not in base tarball (pmc.r.nml?)
- Submit job

Pleiades Cont.

- Fail!
  - Options in pmc.i.nml file are incorrect.
  - We have no idea what these options are.
- Tried to fix the input files.
- Submit.
- Fail!
  - Incorrect domain decomposition
  - Variable npr_yz may be incorrectly set. Change. Resubmit. Fail! No effect.
  - Revert back to original and submit with 192 CPUs. Fail!
- Give up.

Recommendations

- Should include several test cases
  - Do this, that, the other. Run.
  - Post-process. Run this IDL script.
  - Do you get a plot that looks like this?
    - Yes, continue to test 2…
    - No, call this number…
- Should be able to "make rundir" or something and have a valid param file and job file show up in the newly created run directory.
- Should have extremely clear documentation on how to run code.
  - Simple things should be obvious – like how to choose the date you want to run on.
- In theory, should have well documented input files.
- In theory, input files should be trivially easy to understand.

GITM Input File

#DEBUG

0   debug level

0   cpu to watch

10.0   dt between normal code output to stdout

F   usebarriers - forces the code to stop and wait more often

#RESTART

F

#GRID

2   lons

2   lats

-90.0   minimum latitude to model

90.0 maximum latitude to model

0.0   longitude to model (ignored in everything but 1D)

#SAVEPLOTS

7200.0   dt for writing restart files

1   how many output files do you want

3DALL   output style

3600.0   dt for output

#TIMESTART

2002 year

09   month

21   day

00   hour

00   minute

00   second

#TIMEEND

2002 year

09   month

21   day

00   hour

05   minute

00   second

#TIDES

F   UseMSISFlat

T   UseMSISTides

F   UseGSWMTides

F   UseWACCMTides

#GSWMCOMP

F   Diurnal Migrating

F   Diurnal NonMigrating

F   Semidiurnal Migrating

F   Semidiurnal NonMigrating