Porting CLM4.5.06 to Mac OS x10.8 (M. Lion)6/11/13 3:33 PM

1. The prerequisites:

(1) gcc-4.8 full package
(2) mpich-3.0.3 built with gcc-4.8
(3) netcdf-4.1.3 built with gcc-4.8, bundled with mpich-3.0.3
(4) python 2.7, with library of numpy, Scientific, nco support
(5) perl

2. modification/addition of machine files

(1) machine name: Darwin-gnu, so two files needed under /clm-pf-tools/userdefined_machines

env_mach_specific.Darwin-gnu

```
setenv GCC_PATH /usr/local
setenv PATH ${GCC_PATH}/bin:${PATH}
setenv LD_LIBRARY_PATH ${GCC_PATH}/lib
setenv DYLD_LIBRARY_PATH ${GCC_PATH}/lib

alias gmake make
alias gcc-4.8 gcc
alias g++-4.8 g++
alias gfortran-4.8 gfortran

#--- set env variables for Macros if needed
setenv NETCDF_PATH /usr/local/netcdf-4.1.3-gcc48

#------------------------------------------------------------------------
# GENERIC_USER
# Machine specific environment variables are set here.  This might be needed
# to set MPI, core file, IO,  memory or many other things.
#------------------------------------------------------------------------
setenv MPICH_PATH /usr/local/mpich-3.0.3-gcc48
setenv PATH ${MPICH_PATH}/bin:${PATH}
```

mkbatch.Darwin-gnu

This should be a copy of 'mkbatch.userdefined', and make it runnable.

(2) adding a Macros file, named as 'Macros.Darwin-gnu', as following:

```
#
# Makefile Macros generated from /Users/f9y/mygit/clm4-
pf/scripts/ccsm_utils/Machines/config_compilers.xml using
# COMPILER=gnu
# OS=Darwin
# MACH=darwin-gnu
#
CPPDEFS+= -DFORTRANUNDERSCORE -DNO_R16 -DgFORTRAN  -DSYSDARWIN  -DDarwin -DCPRGNU

CXX_LINKER:=FORTRAN

FC_AUTO_R8:= -fdefault-real-8

FFLAGS:= -O -fconvert=big-endian -ffree-line-length-none -ffixed-line-length-none

FFLAGS_NOOPT:= -O0

FIXEDFLAGS:=  -ffixed-form

FREEFLAGS:= -ffree-form

LAPACK_LIBDIR:= /usr/bin

MPICC:= mpicc

MPICXX:= mpicxx

MPIFC:= mpif90

SCC:= gcc

SCXX:= g++
```

```
SFC:= gfortran

SUPPORTS_CXX:=TRUE

ifeq ($(DEBUG), TRUE)
  FFLAGS += -g -Wall
endif

ifeq ($(compile_threaded), true)
  LDFLAGS += -fopenmp
  CFLAGS += -fopenmp
  FFLAGS += -fopenmp
endif

ifeq ($(MODEL), cism)
  CMAKE_OPTS += -D CISM_GNU=ON
endif

ifeq ($(MODEL), driver)
  LDFLAGS += -all_load
  LDFLAGS += -L$(NETCDF_PATH)/lib -lnetcdff -lnetcdf
endif
```

NOTE: this is generated from 'userdefined' mach, but have to edit it for specific env setting (highlighted with red-font) to Darwin OS with gnu compiler.

runCLM.py setup and test on Mac OS X10.8 6/11/13 3:33 PM

(1) PTCLM tools and files

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There are two python scripts:
runCLM.py – the main script to: create/configure a case; setup/build the case; and run the case.
makepointdata.py – a script to extract point grid/fraction and surface data from global half degree datasets.
(Dan's scripts also include a point meteorological data extraction from

(2) Input data

- /atm/datm7/CLM1PT_data/1x1pt_??? (this is the primary climate driver data. Basically you need to prepare by your own. The ??? is the name of point used throughout the setup procedure. And ??? must be defined in /scripts/PTCLM_files/PTCLM_sitedata/xxx_pftdata.txt, xxx_sitedata.txt, xxx_soildata.txt)
- /atm/datm7/domain.clm/domain.lnd.1x1pt_???_navy.nc (this is generated by /scripts/makepointdata.py
- other /atm data is automatically updated, if connected to CESM's site by SVN when build the case

- /lnd/clm2/surfdata/surfdata.1x1pt_???.nc, (or surfdata_dynpft.1x1pt_???.nc for I20TRCLMCN45), also generated by makepointdata.py

  - /ugrid/0.5x0.5data: the following global datasets are required for makepointdata.py to produce the point data:
    domain.360x720_ORCHIDEE0to360.100409.nc
    surfdata_360x720cru_simyr1850_c130415.nc
    surfdata.pftdyn_0.5x0.5_simyr1850-2010.nc

(3) Test run: site US-Brw in AmeriFlux

compset I1850CLM45CN and I20TRCLM45CN

Step 1: ad_spinup

```
./runCLM.py --site=US-Brw --sitegroup=AmeriFlux
            --caseroot=/Users/f9y/mygit/clm4-pf/cases
            --runroot=/Users/f9y/clm4_5_simulations
            --ccsm_input=/Users/f9y/clm4_5_inputdata
            --cesmdir=/Users/f9y/mygit/clm4-pf
            --compset=I1850CLM45CN --coldstart --vertsoilc --CH4 --
no_fire --ad_spinup --nyears_ad_spinup 10
            --mach=userdefined --osname=Darwin --compiler=gnu --
debug --mpilib=mpi-serial
            --ugriddir=ugrid/0.5x0.5data
            --rmold --clean_config --clean_build
```

NOTE – this script will
a. clean-create/setup a case in $caseroot/US-Brw_I1850CLM45CN_ad_spinup;
b. clean-build the case in $runroot/US-Brw_I1850CLM45CN_ad_spinup;
c. run the case in $runroot/US-Brw_I1850CLM45CN_ad_spinup/run, for 10 years (default 600+1 years)

FYI, clm45 no more needs to run 'exit-spinup'.

Step 2: I1850CLM45cn (i.e. spinup)

```
./runCLM.py --site=US-Brw --sitegroup=AmeriFlux
            --caseroot=/Users/f9y/mygit/clm4-pf/cases
            --runroot=/Users/f9y/clm4_5_simulations
            --ccsm_input=/Users/f9y/clm4_5_inputdata
            --cesmdir=/Users/f9y/mygit/clm4-pf
            --compset=I1850CLM45CN --vertsoilc --CH4 --no_fire --
finidat_year 11 --run_n 10
            --mach=userdefined --osname=Darwin --compiler=gnu --
debug --mpilib=mpi-serial
            --ugriddir=ugrid/0.5x0.5data
            --rmold --clean_config --clean_build
```

NOTE – this script will

a. clean-create/setup a case in $caseroot/US-Brw_I1850CLM45CN;
b. clean-build the case in $runroot/US-Brw_I1850CLM45CN;
c. copy all restart files from $runroot/US-Brw_I1850CLM45CN_ad_spinup/run to this case's run root (see below); note the 'finidat_year 11' is from the last run year of the ad_spinup run.
d. run the case in $runroot/US-Brw_I1850CLM45CN/run, for 10 years (default 600 years)

Step 3: transit

```
./runCLM.py --site=US-Brw --sitegroup=AmeriFlux
            --caseroot=/Users/f9y/mygit/clm4-pf/cases
            --runroot=/Users/f9y/clm4_5_simulations
            --ccsm_input=/Users/f9y/clm4_5_inputdata
            --cesmdir=/Users/f9y/mygit/clm4-pf
            --compset=I20TRCLM45CN --vertsoilc --CH4 --no_fire --
finidat_year 11 --run_n 10
            --mach=userdefined --osname=Darwin --compiler=gnu --
debug --mpilib=mpi-serial
            --ugriddir=ugrid/0.5x0.5data
            --rmold --clean_config --clean_build
```

NOTE – this script will do similar run as I1850CLM45CN (spinup), i.e.,
a. clean-create/setup a case in $caseroot/US-Brw_I20TRCLM45CN, including preparation of surface data;
b. clean-build the case in $runroot/US-Brw_I20TRCLM45CN;
c. copy all restart files from $runroot/US-Brw_I1850CLM45CN/run to this case's run root (see below); note the 'finidat_year 11' is from the last run year of the ad_spinup run.
d. run the case in $runroot/US-Brw_I1850CLM45CN/run, for 10 years (default from 1850 – 2006 (the last year in the metdata))

Historical CO2 into 'transit' run –

(TO be updated soon)