Localizing RegCM4

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Fortran Namelist file

NAMELIST provides an excellent way to add annotated input.

```
&nl_name
  key1 = 0,
  key2 = 0.0,
  key3 = 'a string',
  key4 = 1.0,2.0,
/
```

```
program test
  implicit none
  integer :: key1
  real :: key2
  character(len=16) :: key3
  real , dimension(8) :: key4
  namelist /nl_name/ key1,key2, &
                     key3,key4
  open(unit=200, &
       file='test.namelist')
  read(unit=200,nml=nl_name)
end program test
```

Coreparam namelist

```
!
! Choice of the dynamical core
!
 &coreparam
 idynamic = 1,  ! Choice of dynamical core
                ! 1 = MM4 hydrostatical core
                ! 2 = MM5 NON hydrostatical core
 /
```

Dimparam namelist

```
&dimparam
iy      = 34,   ! This is number of points in the N/S direction
jx      = 48,   ! This is number of points in the E/W direction
kz      = 18,   ! Number of vertical levels
dsmin   = 0.01, ! Minimum sigma spacing (only used if kz is not 14, 18, or 23)
dsmax   = 0.05, ! Maximum sigma spacing (only used if kz is not 14, 18, or 23)
nsg     = 1,    ! For subgridding, number of points to decompose. If nsg=1,
                ! no subgridding is performed. CLM does NOT work as of now with
                ! subgridding enabled.
njxcpus = -1,   ! Number of CPUS to be used in the jx (lon) dimension.
                ! If <=0 , the executable will try to figure out a suitable
                ! decomposition.
niycpus = -1,   ! Number of CPUS to be used in the iy (lat) dimension.
                ! If <=0 , the executable will try to figure out a suitable
                ! decomposition.
/
```

Geomparam namelist

```
&geoparam
iproj = 'LAMCON', ! Domain cartographic projection. Supported values are:
                  ! 'LAMCON', Lambert conformal.
                  ! 'POLSTR', Polar stereographic.
                  ! 'NORMER', Normal  Mercator.
                  ! 'ROTMER', Rotated Mercator.
ds = 60.0,        ! Grid point horizontal resolution in km
ptop = 5.0,       ! Pressure of model top in cbar
clat = 45.39,     ! Central latitude  of model domain in degrees
                  ! North hemisphere is positive
clon = 13.48,     ! Central longitude of model domain in degrees
                  ! West is negative.
plat = 45.39,     ! Pole latitude (only for rotated Mercator Proj)
plon = 13.48,     ! Pole longitude (only for rotated Mercator Proj)
truelatl = 30.0,  ! Lambert true latitude (low latitude side)
truelath = 60,    ! Lambert true latitude (high latitude side)
i_band = 0,       ! Use this to enable a tropical band. In this case the ds,
                  ! iproj, clat, clon parameters are not considered.
/
```

Terrainparam namelist

```
&terrainparam
domname  = 'AQWA',            ! Name of the domain/experiment and outfiles
lresamp = .false.,            ! Do a first resampling before interpolation
smthbdy = .false.,            ! Perform extra smoothing in boundaries
h2ohgt = .true.,              ! Allow water points to have hgt greater than 0
ismthlev = 2,                 ! Smoothing level (1-2-1, smoother-desmoother)
roidem = 1.0,                 ! Interpolation radius in ds unit for topography
h2opct = 50.0,                ! Surface min H2O percent to be considered water
lakedpth    = .false.,        ! Produce bathymetry for lake model
lsmoist     = .false.,        ! Initialize surface moisure
fudge_lnd   = .false.,        ! Fudging Control flag, for landuse of grid
fudge_lnd_s = .false.,        ! Fudging Control flag, for landuse of subgrid
fudge_tex   = .false.,        ! Fudging Control flag, for texture of grid
fudge_tex_s = .false.,        ! Fudging Control flag, for texture of subgrid
fudge_lak   = .false.,        ! Fudging Control flag, for lake of grid
fudge_lak_s = .false.,        ! Fudging Control flag, for lake of subgrid
dirter = 'input/',            ! Output directory for terrain files
inpter = 'globdata/',         ! Input directory for SURFACE dataset
tersrc = 'GMTED',             ! Select GMTED or GTOPO DEM data
smsrc  = 'ESACCI',            ! Select soil moisture source dataset
moist_filename = 'moist.nc',  ! Read initial moisture and snow from this file
/
```

Globdatparam namelist

```
&globdatparam
ibdyfrq =     6,              ! boundary condition interval (hours)
ssttyp = 'OI_WK',             ! Type of Sea Surface Temperature used
dattyp = 'EIN15',             ! Type of global analysis datasets used
chemtyp = 'MZ6HR',            ! Type of Global Chemistry boundary conditions
gdate1 = 1990060100,          ! Start date for ICBC data generation
gdate2 = 1990070100,          ! End data for ICBC data generation
calendar = 'gregorian',       ! Calendar type : gregorian, noleap, 360_day
dirglob = 'input/',           ! Path for ICBC produced input files
inpglob = 'globdata/',        ! Path for ICBC global input datasets.
ensemble_run = .false.,       ! If this is a member of a perturbed ensemble
/
```

Timeparam namelists

```
!
! Model start/restart control
!
 &restartparam
 ifrest  = .false. ,   ! If a restart
 mdate0  = 1990060100, ! Global start (is globidate1)
 mdate1  = 1990060100, ! Start date of this run
 mdate2  = 1990060200, ! End date for this run
 /
 &timeparam
 dt     =   150.,    ! time step in seconds
 dtrad  =     0.,    ! time interval solar radiation calculated (minutes)
 dtabem =     0.,    ! time interval absorption-emission calculated (hours)
 dtsrf  =     0.,    ! time interval at which land model is called (seconds)
 dtcum  =     0.,    ! time interval at which cumuls is called (seconds)
 dtche  =     0.,    ! time interval at which chem model is called (seconds)
 /
```

Boundaryparam namelist

```
&boundaryparam
nspgx  = 12, ! nspgx-1 represent the number of cross point slices on
             ! the boundary sponge or relaxation boundary conditions.
nspgd  = 12, ! nspgd-1 represent the number of dot point slices on
             ! the boundary sponge or relaxation boundary conditions.
high_nudge =    3.0D0, ! Nudge value high range
medium_nudge =  2.0D0, ! Nudge value medium range
low_nudge =     1.0D0  ! Nudge value low range
bdy_nm = -1.0, ! Newtonian term, Eq. 7 Giorgi et al, 1993
               ! Default is to use the formulation 1/dt
bdy_dm = -1.0, ! Reverse of diffusion term, Eq. 8 Giorgi et al, 1993
               ! Default is to use the formulation 1/(50*dt)
/
```

Outparam namelist

```
&outparam
ifsave   = .true. ,              ! Create SAV files for restart ?
ifatm    = .true. ,              ! Output ATM ?
ifrad    = .true. ,              ! Output RAD ?
ifsts    = .true. ,              ! Output STS (frequence is daily) ?
ifsrf    = .true. ,              ! Output SRF ?
ifsub    = .true. ,              ! Output SUB ?
iflak    = .true.,               ! Output LAK ?
ifchem   = .true.,               ! Output CHE ?
ifopt    = .false.,              ! Output OPT ?
savfrq   =     0.,               ! Frequency in hours to create (0=monthly)
atmfrq   =     6.,               ! Frequency in hours to write to ATM
radfrq   =     6.,               ! Frequency in hours to write to RAD
srffrq   =     3.,               ! Frequency in hours to write to SRF
subfrq   =     6.,               ! Frequency in hours to write to SUB
lakfrq   =     6.,               ! Frequency in hours to write to LAK
chemfrq =     6.,                ! Frequency in hours to write to CHE
enable_xxx_vars = NN*.true.,     ! Mask to eventually disable variable in XXX
dirout   = './output',           ! Path where all output will be placed
lsync    = .false.,              ! Sync of output files at every timestep
idiag = 0,                       ! Enable tendency diagnostic output in the ATM
/
```

dynparam namelist

```
&dynparam
gnu1 = 0.0625,   ! nu factor for Asselin filter in leapfrog step
gnu2 = 0.0625,   ! nu factor for Asselin filter (tracers)
                 ! MM5 manual , equation 2.4.6
                 ! Default 0.1,0.1 for nonhydro
ckh = 1.0,       ! Background diffusion multiplication factor
adyndif = 1.0,   ! Dynamical diffusion multiplication factor
diffu_hgtf = 1,  ! Add topographic effect to diffusion
upstream_mode = .true.,  ! Add off centering to advection
uoffc = 0.250,           ! Maximum off-centering factor to use
stability_enhance = .true., ! Do not allow horizontal advection
                            ! tendencies if strong gradients
t_extrema = 5.0,     ! Maximum gradient for T advection
q_rel_extrema = 0.2, ! Maximum gradient fraction for QV advection
/
```

Nonhydrostatic namelist

```
!
! Non-hydrostatic core option
!
 &nonhydroparam
 ifupr = 1,          ! Upper radiative boundary condition (Klemp and Durran,
                     ! Bougeault, 1983)
 nhbet = 0.4,        ! Ikawa beta parameter (0.=centered, 1.=backward)
                     ! determines the time-weighting, where zero gives a
                     ! time-centered average and positive values give a bias
                     ! towards the future time step that can be used for
                     ! acoustic damping. In practice, values of
                     ! nhbet = 0.2 - 0.4 are used (MM5 manual, Sec. 2.5.1)
 nhxkd = 0.1,        ! Time weighting for weighting old/new pp
 ifrayd = 1,         ! Upper levels Rayleigh damper to BCs
 rayndamp = 5,       ! Number of top levels to apply
 rayalpha0 = 0.001,  ! Rate alpha0
 rayhd = 10000.0,    ! Damping scale depth
 /
```

Physics namelist(I)

```
&physicsparam
iboudy   =          5,  ! Lateral Boundary conditions scheme
                        !   0 => Fixed
                        !   1 => Relaxation, linear technique.
                        !   2 => Time-dependent
                        !   3 => Time and inflow/outflow dependent.
                        !   4 => Sponge (Perkey & Kreitzberg, MWR 1976)
                        !   5 => Relaxation, exponential technique.
isladvec =          0,  ! Semilagrangian advection scheme for tracers and
                        ! humidity
                        !   0 => Disabled
                        !   1 => Enable Semi Lagrangian Scheme
  iqmsl =           1,  ! Quasi-monotonic Semi Lagrangian
                        !   0 => Standard Semi-Lagrangian
                        !   1 => Bermejo and Staniforth 1992 QMSL scheme
ibltyp   =          1,  ! Boundary layer scheme
                        !   0 => Frictionless
                        !   1 => Holtslag PBL (Holtslag, 1990)
                        !   2 => UW PBL (Bretherton and McCaa, 2004)
```

Physics namelist(II)

```
icup_lnd =            4, ! Cumulus convection scheme Over Land
icup_ocn =            4, ! Cumulus convection scheme Over Icean
                         !   1 => Kuo
                         !   2 => Grell
                         !   3 => Betts-Miller (1986) DOES NOT WORK !!!
                         !   4 => Emanuel (1991)
                         !   5 => Tiedtke (1996)
                         !   6 => Kain-Fritsch (1990), Kain (2004)
                         !  -1 => MM5 Shallow cumulus scheme:
                         !          No precipitation but only mixing.
ipptls  =            1,  ! Moisture scheme
                         !   1 => Explicit moisture (SUBEX; Pal et al 2000)
                         !   2 => Explicit moisture Nogherotto/Tompkins
                         !   3 => Explicit moisture WSM5
```

Physics namelist(III)

```
iocncpl =           0,  ! Ocean SST from coupled Ocean Model through RegESM
                        !   1 => Coupling activated
iwavcpl =           0,  ! Ocean roughness from coupled Wave Model through RegES
                        !   1 => Coupling activated
iocnflx =           2,  ! Ocean Flux scheme
                        !   1 => Use BATS1e Monin-Obukhov
                        !   2 => Zeng et al (1998)
                        !   3 => Coare bulk flux algorithm
  iocnrough =       1,  ! Zeng Ocean model roughness formula to use.
                        !   1 => (0.0065*ustar*ustar)/egrav
                        !   2 => (0.013*ustar*ustar)/egrav + 0.11*visa/ustar
                        !   3 => (0.017*ustar*ustar)/egrav
                        !   4 => Huang 2012 free convection and swell effects
                        !   5 => four regime formulation
  iocnzoq =         1,  ! Zeng Ocean model factors for t,q roughness
                        !   1 => 2.67*(re**d_rfour) - 2.57
                        !   2 => min(4.0e-4, 2.0e-4*re**(-3.3))
                        !   3 => COARE formulation as in bulk flux above
ipgf    =           0,  ! Pressure gradient force scheme
                        !   0 => Use full fields
                        !   1 => Hydrostatic deduction with pert. temperature
iemiss  =           0,  ! Use computed long wave emissivity
lakemod =           0,  ! Use lake model
```

Physics namelist(IV)

```
ichem    =            0,  ! Use active aerosol chemical model
scenario      'RCP4.5',  ! AR5 RCP scenario in RPC2.6, RCP4.5, RCP6.0, RCP8.5
                          ! AR4 old CMIP3 scenario to use in A1B, A2, B1, B2
                          ! CONST scenario at year ghg_year_const
ghg_year_const = 1950,    ! Year to use for a constant GHG concentration values
idcsst    =           0,  ! Use diurnal cycle sst scheme
iseaice   =           0,  ! Model seaice effects
idesseas =            0,  ! Model desert seasonal albedo variability
iconvlwp =            0,  ! Use convective algo for lwp in the large-scale
                          ! This is reset to zero if using ipptls = 2
icldfrac =            1,  ! Cloud fraction algorithm
                          !   0 : Original SUBEX
                          !   1 : Xu-Randall empirical
                          !   2 : Thompson scheme
icldmstrat =          1,  ! Simulate stratocumulus clouds
icumcloud =           1,  ! Formulas to use for cumulus clouds (cf and lwc)
                          ! Cloud fractions, only if mass fluxes are not
                          ! available (Kuo and BM):
                          !   0,1 => cf = 1-(1-clfrcv)**(1/kdepth)
                          !   2   => cf = cloud profile
                          ! Liquid water content:
                          !   0   => constant in cloud
                          !   1,2 => function of temperature
```

Physics namelist(V)

```
 irrtm    =          0, ! Use RRTM radiation scheme instead of CCSM
 iclimao3 =          0, ! Use O3 climatic dataset from SPARC CMIP5
 iclimaaer =         0, ! Use AEROSOL climatic dataset from AERGLOB for non
                        ! interactive aerosol load affecting radiative scheme.
                        ! Requires running chem_icbc
 isolconst =         0, ! Use a constant 1367 W/m^2 instead of the prescribed
                        ! TSI recommended CMIP5 solar forcing data.
 islab_ocean =       0, ! Activate the SLAB ocean model
 itweak =            0, ! Enable tweak scenario
 ifixsolar =         0, ! Fix the solar constant to fixedsolarval
                        ! (no diurnal or seasonal cycle)
 fixedsolarval =  343., ! The constant solar value for ifixsolar = 1
/
```

CLOUDS namelist

```
&cldparam
ncld       = 0,        ! # of bottom model levels with no clouds (rad only)
rhmax      = 1.01,     ! RH at whicn FCC = 1.0
rhmin      = 0.01,     ! RH min value
rh0land    = 0.80,     ! Relative humidity threshold for land
rh0oce     = 0.90,     ! Relative humidity threshold for ocean
tc0        = 238.0,    ! Below this temp, rh0 begins to approach unity
cllwcv     = 0.3e-3,   ! Cloud liquid water content for convective precip.
clfrcvmax = 0.75,      ! Max cloud fractional cover for convective precip.
cftotmax   = 0.75,     ! Max total cover cloud fraction for radiation
k2_const   = 10.0,     ! K2 Factor cumulus mass flux - cloud fraction
kfac_shal = 0.07,      ! Factor cumulus mass flux - cloud fraction - shallow
kfac_deep = 0.14,      ! Factor cumulus mass flux - cloud fraction - deep
lsrfhack   = .false.   ! Surface radiation hack
larcticcorr = .true. ! Vavrus and Waliser Arctic cloud correction
rcrit      = 13.5,     ! Mean critical radius !
coef_ccn   = 2.5e+20, ! Coefficient determined by assuming a lognormal PMD
abulk      = 0.9,      ! Bulk activation ratio
/
```

SUBEX namelist

```
&subexparam
qck1land  = 0.0005,  ! Autoconversion Rate for Land
qck1oce   = 0.0005,  ! Autoconversion Rate for Ocean
gulland   = 0.65,    ! Fract of Gultepe eqn (qcth) when prcp occurs (land)
guloce    = 0.30,    ! Fract of Gultepe eqn (qcth) for ocean
cevaplnd  = 1.0e-5,  ! Raindrop evap rate coef land [[(kg m-2 s-1)-1/2]/s]
cevapoce  = 1.0e-5,  ! Raindrop evap rate coef ocean [[(kg m-2 s-1)-1/2]/s]
caccrlnd  = 6.0,     ! Raindrop accretion rate land  [m3/kg/s]
caccroce  = 6.0,     ! Raindrop accretion rate ocean [m3/kg/s]
conf      = 1.00,    ! Condensation efficiency
/
```

Micro namelist

```
&microparam
stats = .false.,              ! Produce debug variables in output files
budget_compute = .false.,     ! Verify enthalpy and moisture conservation
nssopt = 1,                   ! Supersaturation Computation
                              ! 0 => No scheme
                              ! 1 => Tompkins
                              ! 2 => Lohmann and Karcher
                              ! 3 => Gierens
iautoconv = 4,                !  Choose the autoconversion paramaterization
                              ! => 1 Klein & Pincus (2000)
                              ! => 2 Khairoutdinov and Kogan (2000)
                              ! => 3 Kessler (1969)
                              ! => 4 Sundqvist
vfqr = 4.0,                   ! Rain fall speed (default is 4 m/s)
vfqi = 0.15,                  ! Ice fall speed (default is 0.15 m/s)
vfqs = 1.0,                   ! Snow fall speed (default is 1 m/s)
auto_rate_khair = 0.355,      ! Autoconversion coefficient for kautoconv=2
auto_rate_kessl = 1.e-3,      ! Autoconversion coefficient for kautoconv=3
auto_rate_klepi = 0.5e-3,     ! Autoconversion coefficient for kautoconv=1
rkconv = 1.666e-4,            ! Autoconversion coefficient for kautoconv=4
skconv = 1.0-3,               ! Autoconversion coefficient for snow
rcovpmin = 0.1,               ! Minimum precipitation coverage
rpecons = 5.547e-5,           ! Evaporation constant Kessler
/
```

Grell namelist

```
&grellparam
igcc  = 2,              ! Cumulus closure scheme
                        !   1 => Arakawa & Schubert (1974)
                        !   2 => Fritsch & Chappell (1980)
gcr0 = 0.0020,          ! Conversion rate from cloud to rain
edtmin      = 0.20,     ! Minimum Precipitation Efficiency land (_ocn)
edtmax      = 0.80,     ! Maximum Precipitation Efficiency land (_ocn)
edtmino     = 0.20,     ! Minimum Tendency Efficiency (o var) land (_ocn)
edtmaxo     = 0.80,     ! Maximum Tendency Efficiency (o var) land (_ocn)
edtminx     = 0.20,     ! Minimum Tendency Efficiency (x var) land (_ocn)
edtmaxx     = 0.80,     ! Maximum Tendency Efficiency (x var) land (_ocn)
shrmin      = 0.30,     ! Minimum Shear effect on precip eff. land (_ocn)
shrmax      = 0.90,     ! Maximum Shear effect on precip eff. land (_ocn)
pbcmax = 50.0,          ! Max depth (mb) of stable layer b/twn LCL & LFC
mincld = 150.0,         ! Min cloud depth (mb).
htmin = -250.0,         ! Min convective heating
htmax = 500.0,          ! Max convective heating
skbmax = 0.4,           ! Max cloud base height in sigma
dtauc = 30.0D0          ! Fritsch & Chappell (1980) ABE Removal Timescale (min)
/
```

MIT namelist

```
&emanparam
minsig = 0.95,          ! Lowest sigma level from which convection can originate
elcrit_ocn = 0.0011, ! Autoconversion threshold water content (g/g) (ocean)
elcrit_lnd = 0.0011, ! Autoconversion threshold water content (g/g) (land)
tlcrit = -55.0,         ! Below tlcrit auto-conversion threshold is zero
entp = 1.5,             ! Coefficient of mixing in the entrainment formulation
sigd = 0.05,            ! Fractional area covered by unsaturated dndraft
sigs = 0.12,            ! Fraction of precipitation falling outside of cloud
omtrain = 50.0,         ! Fall speed of rain (Pa/s)
omtsnow = 5.5,          ! Fall speed of snow (Pa/s)
coeffr = 1.0,           ! Coefficient governing the rate of rain evaporation
coeffs = 0.8,           ! Coefficient governing the rate of snow evaporation
cu = 0.7,               ! Coefficient governing convective momentum transport
betae = 10.0,           ! Controls downdraft velocity scale
dtmax = 0.9,            ! Max negative parcel temperature perturbation below LFC
alphae = 0.2,           ! Controls the approach rate to quasi-equilibrium
damp = 0.1,             ! Controls the approach rate to quasi-equilibrium
epmax_ocn = 0.999,      ! Maximum precipitation efficiency (ocean)
epmax_lnd = 0.999,      ! Maximum precipitation efficiency (land)
/
```

Tiedtke namelist

```
&tiedtkeparam
iconv = 4,               ! Actual used scheme.
entrdd  = 3.0e-4,        ! Entrainment rate for cumulus downdrafts
entrpen_xxx = 1.75e-3,  ! Entrainment rate for penetrative convection
detrpen_xxx = 0.75e-4,  ! Detrainment rate for penetrative convection
rcuc_xxx = 0.05,         ! Convective cloud cover for rain evporation
rcpec_xxx = 5.55e-5,    ! Coefficient for rain evaporation below cloud
rhebc_xxx = 0.7,         ! Critical rh below cloud for evaporation
rprc_xxx = 1.4e-3,       ! conversion coefficient from cloud water
entshalp = 2.0,          ! shallow entrainment factor for entrorg
lmfpen     = .true.,     ! penetrative conv is switched on
lmfmid     = .true.,     ! midlevel conv is switched on
lmfdd      = .true.,     ! cumulus downdraft is switched on
lepcld     = .true.,     ! prognostic cloud scheme is on
lmfdudv    = .true.,     ! cumulus friction is switched on
lmfscv     = .true.,     ! shallow convection is switched on
lmfuvdis   = .true.,     ! use kinetic energy dissipation
lmftrac    = .true.,     ! chemical tracer transport is on
lmfsmooth = .false.,    ! smoot of mass fluxes for tracers
lmfwstar   = .false.,   ! Grant w* closure for shallow conv
/
```

Kain Fritsch namelist

```
&kfparam
kf_entrate = 0.03,       ! Entrainment rate
kf_convrate = 0.03,      ! Condensate to rain conversion rate
kf_min_pef = 0.2,        ! Minimum precipitation efficiency
kf_max_pef = 0.9,        ! Maximum precipitation efficiency
kf_dpp     = 150.0,      ! Start elevation for downdraft above cloud base (mb)
kf_tkemax = 5.0,         ! Maximum turbolent kinetic energy in sub cloud layer
kf_min_dtcape = 1800.0, ! Consumption time of CAPE low limit
kf_max_dtcape = 3600.0, ! Consumption time of CAPE high limit
/
```

PBL namelists (I)

```
&holtslagparam
ricr_ocn = 0.25,  ! Critical Richardson Number over Ocean
ricr_lnd = 0.25,  ! Critical Richardson Number over Land
zhnew_fac = 0.25, ! Multiplicative factor for zzhnew in holtpbl
ifaholtth10 = 1,  ! First approximation for obhukov length, th10 formula:
                  !      1 => 0.5 * (t+tg) * (1+0.61*q)
                  !      2 => (0.25*t + 0.75*tg) * (1+0.61*q)
                  !      3 => theta + hf/(k*us)*log(z/10)
                  ! t = air temp., tg = ground temp., q = wv mix. ratio
                  ! hf = total heat flux, z = elevation
                  ! theta = virt. pot. t
ifaholt = 1,      ! th10 final adjustment:
                  !      0 => no adjustment
                  !      1 => max(th10,tg)
                  !      2 => min(th10,tg)
/
```

PBL namelists (II)

```
&uwparam
iuwvadv = 0,   ! 0=standard T/QV/QC advection, 1=GB01-style advection
               ! 1 is ideal for MSc simulation, but may have stability issues
atwo = 15.0,   ! Efficiency of enhancement of entrainment by cloud evap.
               ! see Grenier and Bretherton (2001) Mon. Wea. Rev.
               ! and Bretherton and Park (2009) J. Clim.
rstbl = 1.5,   ! Scaling parameter for stable boundary layer eddy length
               ! scale. Higher values mean stronger mixing in stable
               ! conditions
czero = 5.869, ! Czero constant in UW PBL (eqn 44a and pgs 856-857)
nuk = 5.0,     ! Multiplication factor for diffusion coefficients
/
```

SLAB Ocean namelist

```
&slabocparam
do_qflux_adj  = .false.,  ! Activate SLAB Ocean model surface fluxes adjust
                          ! from an already created climatology
do_restore_sst = .true.,  ! Create during the run the SLAB Ocean model surface
                          ! fluxes climatology to be used in a subsequent run
sst_restore_timescale = 5.0D0,  ! Time interval in days in building the
                                ! q-flux adjustment
mixed_layer_depth     = 50.0D0, ! Depth in meters of the Ocean mixed layer.
/
```

RRTM namelist

```
&rrtmparam
inflgsw  = 2, ! 2 = use RRTM option to calculate cloud optical properties
              !     from water path and cloud drop radius
iceflgsw = 3, ! Flag for ice particle specification
              !   3 => generalized effective size, dge, (Fu, 1996),
              !        dge range is limited to 5.0 to 140.0 microns
              !        [dge = 1.0315 * r_ec]
liqflgsw = 1, ! Flag for liquid droplet specification
              !   1 => The water droplet effective radius (microns) is input
              !        and the optical depths due to water clouds are computed
              !        as in Hu and Stamnes, J., Clim., 6, 728-742, (1993).
inflglw  = 2, ! Flag for cloud optical properties as above but for LW
iceflglw = 3, ! Flag for ice particle specification as above but for LW
liqflglw = 1, ! Flag for liquid droplet specification as above but for LW
icld   = 1,   ! Cloud Overlap hypothesis
irng = 1,     ! mersenne twister random generator for McICA COH
imcica = 1,   ! Cloud optical depth (extinction) is in cloud quantity
/
```

Chem namelist(I)

```
&chemparam
chemsimtype = 'CBMZ    ', ! Which chemical tracers to be activated.
                          ! One in :
                          !   DUST   : Activate 4 dust bins scheme
                          !   SSLT   : Activate 2 bins Sea salt scheme
                          !   DUSS   : Activate DUST + SSLT
                          !   DU12   : Activate 12 dust bins scheme
                          !   CARB   : Activate 4 species black/anthropic
                          !            carbon simulations
                          !   SULF   : Activate SO2 and SO4 tracers
                          !   SUCA   : Activate both SUKF and CARB
                          !   AERO   : Activate all DUST, SSLT, CARB and SULF
                          !   CBMZ   : Activate gas phase and sulfate
                          !   DCCB   : Activate CBMZ +DUST +CARB
                          !   POLLEN : Activate POLLEN transport scheme
ichsolver = 1,  ! Activate the chemical solver
ichsursrc = 1,  ! Enable the emissions
```

Chem namelist(II)

```
ichdrdepo = 1,  ! 1 = enable tracer surface dry deposition. For dust,
                !     it is calculated by a size settling and dry
                !     deposition scheme. For other aerosol,a dry
                !     deposition velocity is simply prescribed further.
ichebdy = 1,    ! Enable boundary conditions read
ichcumtra = 1,  ! 1 = enable tracer convective transport and mixing.
ichremlsc = 1,  ! 1 = wet removal of chemical species (washout and rainout
                !     by total rain) is enabled
ichremcvc = 1,  ! 1 = wet removal of chemical species (washout and rainout
                !     by convective rain) is enabled
ichdustemd = 1, ! Choice for parametrisation of dust emission size distributio
                ! 1 = use the standard scheme (Alfaro et al., Zakey et al.)
                ! 2 = use the the revised soil granulometry + Kok et al., 2011
                ! 3 = use the the CLM4.5 dust emission module.
```

Chem namelist(III)

```
ichdiag = 0,     ! 1 = enable writing of additional diagnostics in the output
idirect    = 1,  ! Choice to enable or not aerosol feedbacks on radiation and
                 ! dynamics (aerosol direct and semi direct effcts):
                 ! 1 = no coupling to dynamic and thermodynamic. However
                 !     the clear sky surface and top of atmosphere
                 !     aerosol radiative forcings are diagnosed.
                 ! 2 = allows aerosol feedbacks on radiative,
                 !     thermodynamic and dynamic fields.
ismoke = 0,      ! Consider emissions from fires (smoke tracer)
iindirect = 0,   ! Enable sulfate indirect effect in radiation scheme
rdstemfac = 1.0,! Aerosol correction factor (Laurent et al, 2008)
ichjphcld = 1,   ! Impact of cloud aod on photolysis coef
ichbion = 0,     ! ???????????????????????????????????///
/
```

CLM 3.5 namelist

```
&clmparam
dirclm = 'input/', ! CLM path to Input data produced by clm2rcm. If
                   ! relative, It should be how to reach the Input dir
                   ! from the Run dir.
clmfrq =  12.,     ! Frequency for CLM own output write
imask  =   1,      ! For CLM, Type of land surface parameterization
                   !   1 => using DOMAIN.INFO for landmask (same as BATS)
                   !   2 => using mksrf_navyoro file landfraction for
                   !        landmask and perform a weighted average over
                   !        ocean/land gridcells; for example:
                   ! tgb = tgb_ocean*(1-landfraction)+tgb_land*landfraction
/
```

CLM 4.5 namelist

```
&clm_inparm
fpftcon = 'pft-physiology.c130503.nc',
fsnowoptics = 'snicar_optics_5bnd_c090915.nc',
fsnowaging = 'snicar_drdt_bst_fit_60_c070416.nc',
/
&clm_soilhydrology_inparm
h2osfcflag = 1,
origflag = 0,
/
&clm_hydrology1_inparm
oldfflag = 0,
/
&clm_regcm
enable_megan_emission = .false.,
enable_urban_landunit = .true.,
enable_more_crop_pft = .false.,
/
```

Tweaking namelist

```
&tweakparam
itweak_sst = 0,                ! Enable adding sst_tweak to input TS
itweak_temperature = 0,        ! Enable adding temperature_tweak to input T
itweak_solar_irradiance = 0, ! Add solar_tweak to solar constant
itweak_greenhouse_gases = 0, ! Multiply gas_tweak_factors to GG concentrations
sst_tweak = 0.0D0,             ! In K
temperature_tweak = 0.0D0,     ! In K
solar_tweak = 0.0D0,           ! In W m-2 (1367.0 is default solar)
gas_tweak_factors = 1.0D0, 1.0D0 , 1.0D0 , 1.0D0 , 1.0D0,
!                   CO2    CH4     N2O     CFC11   CFC12
/
```