# 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', &
       status='old',action='read')
  read(unit=200,nml=nl_name)
end program test
```

# 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.
                             ! Controls naming of input files
smthbdy = .false.,           ! Smoothing Control flag
                             !  true -> Perform extra smoothing in boundaries
lakedpth    = .false.,       ! If using lakemod (see below), produce from
                             ! terrain program the domain bathymetry
ltexture    = .false.,       ! If using DUST tracers (see below), produce
                             ! the domain soil texture dataset
lsmoist     = .false.,       ! Use Satellite Soil Moisture Dataset for
                             ! initialization of soil moisture.
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
h2opct = 50.,                ! Surface min H2O percent to be considered water
h2ohgt = .false.,            ! Allow water points to have hgt greater than 0
ismthlev = 1,                ! How many times apply the 121 smoothing
dirter = 'input/',           ! Output directory for terrain files
inpter = 'globdata/',        ! Input directory for SURFACE 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
                               !  One in: GISST, OISST, OI2ST, OI_WK, OI2WK,
                               !          FV_A2, FV_B2, EH5A2, EH5B1, EHA1B,
                               !          EIN75, EIN15, ERSST, ERSKT, CCSST,
                               !          CA_XX, HA_XX, EC_XX, IP_XX, GF_XX,
                               !          CN_XX, MP_XX
dattyp = 'EIN15',              ! Type of global analysis datasets used
                               !  One in: ECMWF, ERA40, EIN75, EIN15, EIN25,
                               !          ERAHI, NNRP1, NNRP2, NRP2W, GFS11,
                               !          FVGCM, FNEST, EH5A2, EH5B1, EHA1B,
                               !          CCSMN, ECEXY, CA_XX, HA_XX, EC_XX,
                               !          IP_XX, GF_XX, CN_XX, MP_XX
                               ! with XX for CMIP5 datasets in 26, 45, 85
chemtyp = 'MZ6HR',             ! Type of Global Chemistry boundary conditions
                               ! One in : MZ6HR, 6 hours MOZART output
                               !        : MZCLM, MOZART climatology 1999-2009
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
                               ! run. Activate random noise added to input
                               ! ICBC controlled by the perturbparam stanza
                  ! Look http://users.ictp.it/~pubregcm/RegCM4/globedat.htm
                  ! on how to download them.
/
```

# Timeparam namelists

```
&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  =   900.,   ! time interval at which chem model is called (seconds)
/
```

# Bounsaryparam 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
/
```

# Outparam namelist

```
&outparam
ifsave   = .true. ,             ! Create SAV files for restart
savfrq   =     0.,              ! Frequency in hours to create them (0 = monthly)
ifatm    = .true. ,             ! Output ATM ?
atmfrq   =     6.,              ! Frequency in hours to write to ATM
ifrad    = .true. ,             ! Output RAD ?
radfrq   =     6.,              ! Frequency in hours to write to RAD
ifsts    = .true. ,             ! Output STS (frequence is daily) ?
ifsrf    = .true. ,             ! Output SRF ?
srffrq   =     3.,              ! Frequency in hours to write to SRF
ifsub    = .true. ,             ! Output SUB ?
subfrq   =     6.,              ! Frequency in hours to write to SUB
iflak    = .true.,              ! Output LAK ?
lakfrq   =     6.,              ! Frequency in hours to write to LAK
ifchem   = .true.,              ! Output CHE ?
ifopt    = .false.,             ! Output OPT ?
chemfrq =      6.,              ! Frequency in hours to write to CHE
enable_atm_vars = 67*.true., ! Mask to eventually disable variables ATM
enable_srf_vars = 35*.true., ! Mask to eventually disable variables SRF
enable_rad_vars = 25*.true., ! Mask to eventually disable variables RAD
enable_sub_vars = 18*.true., ! Mask to eventually disable variables SUB
enable_sts_vars = 18*.true., ! Mask to eventually disable variables STS
enable_lak_vars = 18*.true., ! Mask to eventually disable variables LAK
enable_opt_vars = 19*.true., ! Mask to eventually disable variables OPT
enable_che_vars = 26*.true., ! Mask to eventually disable variables CHE
dirout   = './output',          ! Path where all output will be placed
lsync    = .false.,             ! If sync of output files at every timestep is
                                ! requested. Note, it has a performance impact.
                                ! Enabled by default if debug_level > 2
idiag = 0,                      ! Enable tendency diagnostic output in the ATM
                                ! file. NOTE: output file gets HUGE.
/
```

# 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
ibltyp   =          1,  ! Boundary layer scheme
                        !   0 => Frictionless
                        !   1 => Holtslag PBL (Holtslag, 1990)
                        !   2 => UW PBL (Bretherton and McCaa, 2004)
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)
  igcc   =          1,  ! Grell Scheme Cumulus closure scheme
                        !   1 => Arakawa & Schubert (1974)
                        !   2 => Fritsch & Chappell (1980)
ipptls   =          2,  ! Moisture scheme
                        !   1 => Explicit moisture (SUBEX; Pal et al 2000)
                        !   2 => Explicit moisture Nogherotto/Tompkins
```

# Physics namelist(II)

```
iocnflx =           2,  ! Ocean Flux scheme
                        !   1 => Use BATS1e Monin-Obukhov
                        !   2 => Zeng et al (1998)
                        !   3 => Coare bulk flux algorithm (snowice),
                        !        only activated with coupling
icumcloud =         2,  ! Use different models for cumulus clouds
iocncpl =           0,  ! Activates RegCM-ROMS coupled model
                        !   0 => no coupling
                        !   1 => coupling activated
iwavcpl =           0,  ! Activates Wave coupled model
                        !   0 => no coupling
                        !   1 => coupling activated
  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
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(III)

```
ichem    =          0,  ! Use active aerosol chemical model
scenario =      'A1B', ! IPCC Scenario to use in A1B,A2,B1,B2
                       ! RCP Scenario in RCP3PD,RCP4.5,RCP6,RCP8.5
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
icldfrac =          1, ! Cloud fraction algorithm
                       !   0 : Original SUBEX
                       !   1 : Xu-Randall empirical
irrtm    =          0, ! Use RRTM radiation scheme instead of CCSM
iclimao3 =          0, ! Use O3 climatic dataset from SPARC CMIP5
isolconst =         1, ! 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, ! Tweak parameter. Enables modifications in tweakparam.
/
```

# SUBEX namelist

```
&subexparam
ncld      =          1, ! # of bottom model levels with no clouds
qck1land  =   .250E-03, ! Autoconversion Rate for Land
qck1oce   =   .250E-03, ! Autoconversion Rate for Ocean
gulland   =        0.4, ! Fract of Gultepe eqn (qcth) when precip occurs
guloce    =        0.4, ! Fract of Gultepe eqn (qcth) for ocean
rhmax     =       1.01, ! RH at whicn FCC = 1.0
rh0oce    =       0.90, ! Relative humidity threshold for ocean
rh0land   =       0.80, ! Relative humidity threshold for land
tc0       =      238.0, ! Below this temperature, rh0 begins to approach unity
cevaplnd  =   .100E-02, ! Raindrop evap rate coef [[(kg m-2 s-1)-1/2]/s]
cevapoce  =   .100E-02, ! Raindrop evap rate coef [[(kg m-2 s-1)-1/2]/s]
caccrlnd  =      3.000, ! Raindrop accretion rate [m3/kg/s]
caccroce  =      3.000, ! Raindrop accretion rate [m3/kg/s]
cllwcv    =     0.3E-3, ! Cloud liquid water content for convective precip.
clfrcvmax =       1.00, ! Max cloud fractional cover for convective precip.
cftotmax  =       0.75, ! Max total cover cloud fraction for radiation
conf      =      1.0D0, ! Condensation threshold
/
```

# Micro namelist

```
&microparam
 budget_compute = .false.,  ! Verify enthalpy and moisture conservation
 nssopt = 1,                ! Supersaturation Computation
                            ! 0 => No scheme
                            ! 1 => Tompkins
                            ! 2 => Lohmann and Karcher
                            ! 3 => Gierens
 kautoconv = 4,             !  Choose the autoconversion paramaterization
                            ! => 1 Klein & Pincus (2000)
                            ! => 2 Khairoutdinov and Kogan (2000)
                            ! => 3 Kessler (1969)
                            ! => 4 Sundqvist
 ksemi = 1.0D0,             ! Implicit/Explicit control
                            ! NOT ACTIVATED YET - IT DOES NOT WORK!
                            ! ksemi == 0 => scheme is fully explicit
                            ! ksemi == 1 => scheme is fully implicit
                            ! 0<ksemi<1  => scheme is semi-implicit
 vqxr = 4.0D0,              ! Rain fall speed (default is 4 m/s)
 vqxi = 0.15D0,             ! Ice fall speed (default is 0.15 m/s)
 vqxs = 1.0D0,              ! Snow fall speed (default is 1 m/s)
 zauto_rate_khair = 0.355D0,! Autoconversion coefficient for kautoconv=2
 zauto_rate_kessl = 1.D-3,  ! Autoconversion coefficient for kautoconv=3
 zauto_rate_klepi = 0.5D-3, ! Autoconversion coefficient for kautoconv=1
 rkconv = 1.666D-4,         ! Autoconversion coefficient for kautoconv=4
 rcovpmin = 0.1D0,          ! Minimum precipitation coverage
 rpecons = 5.547D-5,        ! Evaporation constant Kessler
/
```

# Grell namelist

```
&grellparam
gcr0 = 0.002,          ! Conversion rate from cloud to rain
shrmin = 0.25,         ! Minimum Shear effect on precip eff.
shrmax = 0.50,         ! Maximum Shear effect on precip eff.
edtmin = 0.25,         ! Minimum Precipitation Efficiency
edtmax = 0.50,         ! Maximum Precipitation Efficiency
edtmino = 0.25,        ! Minimum Precipitation Efficiency (o var)
edtmaxo = 0.50,        ! Maximum Precipitation Efficiency (o var)
edtminx = 0.25,        ! Minimum Precipitation Efficiency (x var)
edtmaxx = 0.50,        ! Maximum Precipitation Efficiency (x var)
shrmin_ocn = 0.25,     ! Minimum Shear effect on precip eff. OCEAN points
shrmax_ocn = 0.50,     ! Maximum Shear effect on precip eff.
edtmin_ocn = 0.25,     ! Minimum Precipitation Efficiency
edtmax_ocn = 0.50,     ! Maximum Precipitation Efficiency
edtmino_ocn = 0.25,    ! Minimum Precipitation Efficiency (o var)
edtmaxo_ocn = 0.50,    ! Maximum Precipitation Efficiency (o var)
edtminx_ocn = 0.25,    ! Minimum Precipitation Efficiency (x var)
edtmaxx_ocn = 0.50,    ! Maximum Precipitation Efficiency (x var)
pbcmax = 150.0,        ! 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 = 30.0,          ! 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) over ocean
elcrit_lnd = 0.0011, ! Autoconversion threshold water content (g/g) over 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.
entrmax = 1.75D-3,      ! Max entrainment iconv=[1,2,3]
entrdd  = 3.0D-4,       ! Entrainment rate for cumulus downdrafts
entrpen = 1.75D-3,      ! Entrainment rate for penetrative convection
entrscv = 3.0D-4,       ! Entrainment rate for shallow convection iconv=[1,2,3]
entrmid = 1.0D-4,       ! Entrainment rate for midlevel convection iconv=[1,2,3]
cprcon = 1.0D-4,        ! Coefficient for determining conversion iconv=[1,2,3]
detrpen = 0.75D-4,      ! Detrainment rate for penetrative convection iconv=4
entshalp = 2.0D0,       ! shallow entrainment factor for entrorg iconv=4
rcuc_lnd = 0.05D0,      ! Convective cloud cover for rain evporation iconv=4
rcuc_ocn = 0.05D0,      ! Convective cloud cover for rain evporation iconv=4
rcpec_lnd = 5.55D-5,    ! Coefficient for rain evaporation below cloud iconv=4
rcpec_ocn = 5.55D-5,    ! Coefficient for rain evaporation below cloud iconv=4
rhebc_lnd = 0.7D0,      ! Critical rh below cloud for evaporation iconv=4
rhebc_ocn = 0.9D0,      ! Critical rh below cloud for evaporation iconv=4
rprc_lnd = 1.4D-3,      ! conversion coefficient from cloud water iconv=4
rprc_ocn = 1.4D-3,      ! conversion coefficient from cloud water iconv=4
/
```

# Kain Fritsch namelist

```
&kfparam
kf_entrate = 0.03D0,      ! Entrainment rate
kf_min_pef = 0.2D0,       ! Minimum precipitation efficiency
kf_max_pef = 0.9D0,       ! Maximum precipitation efficiency
kf_dpp     = 150.0D0,     ! Start elevation for downdraft above cloud base (mb)
kf_min_dtcape = 1800.0D0 ! Consumption time of CAPE low limit
kf_max_dtcape = 3600.0D0 ! Consumption time of CAPE high limit
kf_tkemax = 5.0D0         ! Maximum turbolent kinetic energy in sub cloud layer
/
```

# PBL namelists

```
&holtslagparam
ricr_ocn = 0.25D0,  ! Critical Richardson Number over Ocean
ricr_lnd = 0.25D0,  ! Critical Richardson Number over Land
zhnew_fac = 0.25D0, ! Multiplicative factor for zzhnew in holtpbl
/
&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 = 15.0D0,    ! Efficiency of enhancement of entrainment by cloud evap.
                  !  see Grenier and Bretherton (2001) Mon. Wea. Rev.
                  !  and Bretherton and Park (2009) J. Clim.
rstbl = 1.5D0,    ! Scaling parameter for stable boundary layer eddy length
                  ! scale.  Higher values mean stronger mixing in stable
                  ! conditions
czero = 5.869D0, ! Czero constant in UW PBL (eqn 44a and pgs 856-857)
nuk = 5.0D0,      ! Multiplication coefficient for kethl used also
                  ! in diffusion of TKE to avoid eccesive stability
/
```

# 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, ! 0 = use the optical properties calculated in prep_dat_rrtm
              !     (same as standard radiation)
              ! 2 = use RRTM option to calculate cloud optical properties
              !     from water path and cloud drop radius
iceflgsw = 3, ! Flag for ice particle specification
              !   0 => ice effective radius, r_ec, (Ebert and Curry, 1992),
              !        r_ec must be >= 10.0 microns
              !   1 => ice effective radius, r_ec, (Ebert and Curry, 1992),
              !        r_ec range is limited to 13.0 to 130.0 microns
              !   2 => ice effective radius, r_k, (Key, Streamer Ref. Manual,
              !        1996), r_k range is limited to 5.0 to 131.0 microns
              !   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
              !   0 => Compute the optical depths due to water clouds in ATM
              !        (currently not supported)
              !   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
/
```

# 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
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
```

# Chem namelist(II)

```
ichdustemd = 1, ! Choice for parametrisation of dust emission size distribution
                ! 1 = use the standard scheme (Alfaro et al., Zakey et al.)
                ! 2 = use the the revised soil granulometry + Kok et al., 2011
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.
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,
/
```

# 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
/
```