Overview of all namoptions in DALES

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Chapter 1

Introduction

This document gives an overview of all namelist options in version 4.4 of the Dutch Atmospheric Large Eddy Simulation (DALES) model. Only general information concerning these options is presented. For more detailed information about the basic model, the reader is referred to Heus et al. (2009). This paper describes the code of DALES version 3.2.

Chapter 2

Namoptions overview

All options that can be set for the LES experiments will be discussed in the following paragraphs. These options are listed in a separate paragraph for all namelists. For all namelists, the options are given with their default values, possible values, a description and the unit. The possible values are denoted by an x. The paragraphs are grouped in two sections. In the first section, the main modules are discussed. In the second section an overview of the extra modules is presented.

2.1 Main modules

2.1.1 Namelist DOMAIN

Option	Default	Possible values	Description	Unit
itot	64	$x = n \cdot \text{nprocx}, \quad n \in \mathbb{N}^*$	Number of horizontal grid points in x-direction	-
jtot	64	$x = n \cdot \text{nprocy}, \quad n \in \mathbb{N}^*$	Number of horizontal grid points in y-direction	-
kmax	96	$x \in \mathbb{N}^*$	Number of vertical grid points	-
xsize	-1	$x \in \mathbb{N}^*$	Horizontal size of the simulated domain	m
ysize	-1	$x \in \mathbb{N}^*$	Horizontal size of the simulated domain	m
xlat	52	$x \in \mathbb{R}, \quad -90 \leq x \leq 90$	Latitude	$^\circ$
xlon	0	$x \in \mathbb{R}, \quad 0 \leq x \leq 360$	Longitude	$^\circ$
xyear	0	$x \in \mathbb{Z}$	Number of the year (only for output)	-
xday	1	$x \in \mathbb{R}, \quad 1 \leq x \leq 365$	Number of the day	-
xtime	0	$x \in \mathbb{R}, \quad 0 \leq x < 24$	UTC time of the day	h
ksp	min($\frac{3}{4}$kmax, kmax - 15)	$x \in \mathbb{N}^*$	Lower height of sponge layer	-

2.1.2 Namelist DYNAMICS

Option	Default	Possible values	Description	Unit
cu	0	$x \in \mathbb{R}$	Transformation velocity of the Galilei transformation in x-direction	m s^{-1}
cv	0	$x \in \mathbb{R}$	Transformation velocity of the Galilei transformation in y-direction	m s^{-1}
llsadv	.false.	$x \in \{$.false., .true.$\}$	Switch for large scale forcings	-
lqlnr	.true.	$x \in \{$.false., .true.$\}$	Switch for Newton-Raphson approximation of the liquid water content	-
lnoclouds	.false.	$x \in \{$.false., .true.$\}$	Switch to disable q_l calculations	-
iadv_mom iadv_tke iadv_thl iadv_qt iadv_sv(1:nsv)	5 -1 -1 -1 -1	$x \in \{1, 2, 5, 52, 55, 6, 62, 7\}$	Advection scheme for momentum, TKE, θ_l, q_t and scalars: 1 = 1st order upwind 2 = 2nd order central difference 5 = 6th order central + 5th order upwind 52 = Horizontal 5th & vertical 2nd 55 = Hybrid scheme 555 = Alternative hybrid scheme 6 = 6th order central difference 62 = Horizontal 6th & vertical 2nd 7 = Kappa scheme	-
ibas_prf	3	$x \in \{1, 2, 3, 4, 5\}$	Flag for density calculations based on 1 = Constant θ_v 2 = Boussinesq-like (similar to DALES 3) 3 = Standard lapse rate, based on surface temp. 4 = Standard lapse rate, based on Tsurf = 15 °C 5 = User defined (using the file baseprof.inp.###)	-

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Option	Default	Possible values	Description	Unit
lambda_crit	100	$x \in \mathbb{R}$	Maximum value for the smoothness. This controls if WENO for the hybrid advection scheme	-

2.1.3 Namelist PHYSICS

Option	Default	Possible values	Description	Unit
thls	-1	$x \in \mathbb{R}, \quad x > 0$	Liquid water potential temperature at the surface	K
ps	-1	$x \in \mathbb{R}, \quad x > 0$	Pressure at the surface	Pa
isurf	-1	$x \in \{1, 2, 3, 4, 10\}$	Flag for surface parametrization 1 = Interactive scheme (using radiation) 2 = Forced surface temperature; fluxes are calculated 3 = Forced momentum, moisture and heat flux; surface temperature is calculated 4 = Forced moisture and heat flux; u_* and surface temperature are calculated 10 = User defined surface scheme. Can only be used for certain cases (using the file moduser.f90)	-

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Option	Default	Possible values	Description	Unit
z0	-1	$x \in \mathbb{R}, \quad x > 0$	Surface roughness	m
ustin	-1	$x \in \mathbb{R}, \quad x > 0$	Prescribed friction velocity	m s^{-1}
wtsurf	-1	$x \in \mathbb{R}, \quad x > 0$	Flux of liq. water pot. temp. at the surface	K m s^{-1}
wqsurf	-1	$x \in \mathbb{R}$	Flux of total water content	kg kg^{-1} m s^{-1}
wsvsurf(1:nsv)	0	$x \in \mathbb{R}$	Flux of scalar n at the surface	ppb m s^{-1}
ltimedep	.false.	$x \in \{$.false., .true.$\}$	Switch for timedependent fluxes and large scale forcings	-
ltimedepuv	.false.	$x \in \{$.false., .true.$\}$	Also inlude u,v forcings in ls_flux.inp	-
ltimedepsv	.false.	$x \in \{$.false., .true.$\}$	Switch for timedependent fluxes of scalars	-
ntimedep	100	$x \in \mathbb{N}$	Maximum number of time points for time-dependent forcings	-
lcoriol	.true.	$x \in \{$.false., .true.$\}$	Switch for coriolis force	-
igrw_damp	2	$x \in \{-1, 0, 1, 2, 3\}$	Flag for gravity wave damping 0 = no damping 1 = fast damping of wind to average wind & slow damping of average to geowind 2 = fast damping of wind to geowind 3 = fast damping of wind to average wind -1 = nudging grid averaged wind to wind field provided by lscale.inp	-

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Option	Default	Possible values	Description	Unit
geodamptime	7200	$x \in \mathbb{R}, \quad x > 0$	Time scale for nudging to geowind in sponge layer	s
lmomsubs	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch to apply subsidence on momentum	-
lmoist	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for calculation of moisture fields	-
chi_half	0.5	$x \in \mathbb{R}, \quad 0 \leq x \leq 1$	Wet, dry or intermediate (default) mixing over the cloud edge	-
timerad	0	$x \in \mathbb{R}, \quad x > 0$	Value for sampling interval of radiation scheme	s
iradiation	0	$x \in \{0, 1, 2, 3, 4, 10\}$	Flag for radiation calculations 0 = No radiation 1 = Full radiation 2 = Parametrized radiation 3 = Simple surface radiation for land surface model 4 = Radiation using the rapid radiative transfer model 10 = User defined radiation (use `rad_user.f90`)	-
useMcICA	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for the Monte Carlo Independent Column Approach	-
rad_ls	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for prescribed radiative forcing	-
rad_longw	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for parametrized longwave radiative forcing	-
rad_shortw	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for parametrized shortwave radiative forcing	-
rad_smoke	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for longwave divergence for smoke cloud	-
irad	-1	$x \in \{-1, 0, 1, 2, 3, 4, 10\}$	Deprecated flag to force (iradiation, rad_ls, rad_longw, rad_shortw, rad_smoke) -1 = - 0 = (0,-,-,-,-) 1 = (2,.true.,.false.,.false.,.false.) 2 = (2,.false.,.true.,.false.,.false.)	-

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Option	Default	Possible values	Description	Unit
			3 = (1,-,-,-,-) 4 = (2,.false.,.true.,.true.,.false.) 10 = (2,.false.,.false.,.false.,.true.)	
rka	130	$x \in \mathbb{R}, \quad x > 0$	Extinction coefficient (used if $iradiation = 2$)	$\mathrm{m^2\ kg^{-1}}$
dlwbot	0	$x \in \mathbb{R}, \quad x \geq 0$	Longwave radiative flux jump at cloud bottom	$\mathrm{W\ m^{-2}}$
dlwtop	74	$x \in \mathbb{R}, \quad x \geq 0$	Longwave radiative flux jump at cloud top	$\mathrm{W\ m^{-2}}$
sw0	1100	$x \in \mathbb{R}, \quad x \geq 0$	Direct solar radiative component cloud top (assumes zero diffusive contribution)	$\mathrm{W\ m^{-2}}$
gc	0.85	$x \in \mathbb{R}, \quad 0 \leq x \leq 1$	Asymmetry factor of droplet scattering angle distribution; overwritten to 0.64 if laero = .true.	-
reff	1e-5	$x \in \mathbb{R}, \quad x > 0$	Cloud drop effective radius	m
isvsmoke	1	$x \in \mathbb{N}^*, x \leq \mathrm{nsv}$	Scalar field to be used for optical depth calculation (when rad_smoke = .true.)	-
lforce_user	.false.	$x \in \{.false., .true.\}$	Switch for user-defined forcing. Can only be used for certain cases (using the file moduser.f90)	-
lcloudshading	.false.	$x \in \{.false., .true.\}$	Switch to let clouds shade the surface for rad_lsm	-
lrigidlid	.false.	$x \in \{.false., .true.\}$	Switch to enable simulations with a rigid lid	-
unudge	1	$x \in \mathbb{R}, \quad 0 \leq x \leq 1$	Nudging factor if igrw_damp is -1	-
uvdamprate	0	$x \in \mathbb{R}, \quad 0 \leq x$	damp u and v to geostrophic wind with this rate constant	-
lfast_thermo	.false.	$x \in \{.false., .true.\}$	Enable a faster thermodynamics routine	
lconstexner	.false.	$x \in \{.false., .true.\}$	Keep the exner function constant in time, calculated from the initial profile	

2.1.4 Namelist RUN

Option	Default	Possible values	Description	Unit
iexpnr	0	$x \in \mathbb{N}, \quad 0 \leq x < 1000$	Experiment number; every output filename ends with [.iexpnr]	-
dtmax	20	$x \in \mathbb{R}, \quad x > 0$	Maximum timestep that is used by the model	s
wctime	8640000.	$x \in \mathbb{R}, \quad x > 0$	Maximum wall clock time of a simulation	s
runtime	300	$x \in \mathbb{R}, \quad x > 0$	Total simulation (or: run) time	s
ltotruntime	.false.	$x \in \{$.false., .true.$\}$	If true, the runtime is counted since the last cold start instead of the last warm start	-
lwarmstart	.false.	$x \in \{$.false., .true.$\}$	Flag for a "cold" or a "warm" start	-
startfile	-	x = 'initd###h##mx###y###.###'	Basis for the name of the restartfiles	-
trestart	3600	$x \in \mathbb{R}$	trestart > 0: Each $trestart$ seconds, a restart file is written to disk trestart $= 0$: A restart file is written at the end of the simulation trestart < 0: No restart file is written	s
dtav_glob	60	$x = n \cdot$ dtmax, $\quad n \in \mathbb{N}^*$	Global value for sampling interval of statistical routines	s
timeav_glob	3600	$x = n \cdot$ dtav_glob, $\quad n \in \mathbb{N}^*$	Global value for writing interval of statistical routines	s
irandom	0	$x \in \mathbb{Z}$	Number to feed randomnizer with	-
krand	kmax	$x \in \mathbb{N}, \quad 1 \leq x \leq$ kmax	Top vertical full level of randomnization	-
randqt	1e-5	$x \in \mathbb{R}, \quad x \geq 0$	Amplitude of randomnization of qt	kg kg^{-1}
randthl	0.1	$x \in \mathbb{R}, \quad x \geq 0$	Amplitude of randomnization of thl	K
nsv	0	$x \in \mathbb{N}, \quad 0 \leq x \leq 100$	Number of additional passive scalars	-
ladaptive	.false.	$x \in \{$.false., .true.$\}$	If .true., this allows the model to vary time step, depending on numerical stability criteria	-
courant	0.7 or 1*	$x \in \mathbb{R}, \quad x > 0$	Courant number	-
peclet	0.15	$x \in \mathbb{R}, \quad x > 0$	Peclet number	-
author	""	$x =$ "...."	Name of the author	-
krandumin	1	$x \in \mathbb{N}^*, x \leq$ kmax	Bottom vertical full level of wind randomnization	-

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Option	Default	Possible values	Description	Unit
krandumax	0	$x \in \mathbb{N}, x \leq$ kmax	Top vertical full level of wind randomnization	-
randu	0.5	$x \in \mathbb{R}, \quad x \geq 0$	Amplitude of randomnization of wind speed	m s^{-1}
nprocx	1	$x = N_{\text{processors}}/n, \quad n, x \in \mathbb{N}^*$	Number of processors in x direction; if set to 0, MPI will determine suitable value	-
nprocy	0	$x = N_{\text{processors}}/\text{nprocx}$	Number of processors in y direction; if set to 0, MPI will determine suitable value	-
loutdirs	.false.	$x \in \{$.false., .true.$\}$	If .true., per-task output files are stored in subdirectory myidy/	-

*If iadv_mom $\in \{6, 62\}$ or any value of iadv_tke, iadv_thl, iadv_qt or iadv_sv $\in \{6, 62, 7\}$, courant = 0.7 as standard. Otherwise default value is 1.

2.1.5 Namelist NAMSUBGRID

Option	Default	Possible values	Description	Unit
ldelta	.false.	$x \in \{$.false., .true.$\}$	Switch for diminished sfs in stable flow	-
lmason	.false.	$x \in \{$.false., .true.$\}$	Switch for decreased length scale near the surface	-
cf	2.5	$x \in \mathbb{R}, \quad x > 0$	Filter constant	-
cn	0.76	$x \in \mathbb{R}, \quad x > 0$	Subfilter scale parameter	-
Rigc	0.25	$x \in \mathbb{R}, \quad x > 0$	Critical Richardson number	-
Prandtl	$\frac{1}{3}$	$x \in \mathbb{R}, \quad x > 0$	Prandtl number	-
lsmagorinsky	.false.	$x \in \{$.false., .true.$\}$	Switch for Smagorinsky subgrid scheme	-
lanisotrop	.false.	$x \in \{$.false., .true.$\}$	Switch for anisotropic subgrid scheme	-
cs	-1	$x \in \mathbb{R}, \quad x > 0$	Smagorinsky constant	-
nmason	2	$x \in \mathbb{R}, \quad x > 0$	Exponent in Mason correction function	-
sgs_surface_fix	.true.	$x \in \{$.false., .true.$\}$	Switch to apply a fix to the coupling of SFS TKE to the surface (experimental)	-

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Option	Default	Possible values	Description	Unit
ch1	1.0	$x \in \mathbb{R}, \quad x > 0$	Subfilter scale parameter	-

2.1.6 Namelist SOLVER

Use only if DALES has been compiled with HYPRE support, which is optional.

Option	Default	Possible values	Description	Unit
solver_id	0	$x \in \{0, ..., 6, 100\}$	Poisson solver. 0 = FFT (default) 1 = SMG(if compiled with HYPRE) 2 = PFMG 3 = BiCGSTAB 4 = GMRES 5 = PCG 6 = LGMRES 100 = FFTW(if compiled with FFTW)	-
precond	1	$x \in \{0, 1, 2, 7, 8, 9\}$	Preconditioner. When solver_id $\in \{4, 5, 6, 7\}$: 0 - SMG preconditioner (n_pre, n_post) 1 - PFMG preconditioner (n_pre, n_post) 7 - Jacobi preconditioner (solver_id=5) 8 - DS preconditioner 9 - no preconditioner When solver_id $\in \{2\}$: 1 - wighted Jacobi 2 - red-black GS	-
n_pre	1	$x \in \mathbb{N}$	Number of pre relaxation steps. When solver_id $\in \{1, 2\}$ or precond $\in \{0, 1, 2\}$	-
n_post	1	$x \in \mathbb{N}$	Number of post relaxation steps. When solver_id $\in \{1, 2\}$ or precond $\in \{0, 1, 2\}$	-

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Option	Default	Possible values	Description	Unit
maxiter	10000	$x \in \mathbb{N}^*$	Number of iterations	-
tolerance	10^{-8}	$x > 0$	Tolerance threshold for stopping the iterative solver	-

In the SOLVER namelist the method for solving the Poisson equation can be selected. The traditional method is FFT. The other methods use iterative linear algebra methods from the HYPRE library. These can only be used if DALES has been compiled with HYPRE support, which is optional. The iterative methods were introduced in DALES version 4.3, and are still considered experimental. In general, FFT is faster on a single or a few cores, but the iterative methods may scale better. To apply this, as a starting point, the following parameters can be used:

```
&SOLVER
solver_id = 2
precond = 2
n_pre = 2
n_post = 2
tolerance = 1E-12
/
```

2.2 Extra modules

2.2.1 Namelist NAMAGScross

Option	Default	Possible values	Description	Unit
lAGScross	.false.	$x \in \{.false., .true.\}$	Switch to enable A-g_s specific output; requires lrsags = .true.	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s

2.2.2 Namelist NAMBUDGET

Option	Default	Possible values	Description	Unit
lbudget	.false.	$x \in \{.false., .true.\}$	Switch for turbulent TKE budget calculation	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.3 Namelist NAMBULKMICROSTAT

Option	Default	Possible values	Description	Unit
lmicrostat	.false.	$x \in \{.false., .true.\}$	Switch for microphysics statistics calculation	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.4 Namelist NAMCANOPY

Option	Default	Possible values	Description	Unit
lcanopy	.false.	$x \in \{.false., .true.\}$	Switch to represent canopy drag	-
ncanopy	10	$x \in \mathbb{N}^*, x \leq \text{kmax}$	Amount of layers that contain canopy	-
cd	0.15	$x \in \mathbb{R}, \quad x > 0$	Drag coefficient	-
lai	2	$x \in \mathbb{R}, \quad x \geq 0$	One-sided plant area index of the canopy	-

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Option	Default	Possible values	Description	Unit
lpaddistr	.false.	$x \in \{.false., .true.\}$	Switch to make use of customized plant area density (prescribed at half levels in paddistr.inp)	-
npaddistr	11	$x \in \mathbb{N}, \quad x \geq 2$	Amount of half levels prescribed in paddistr.inp	-
wth_can	0	$x \in \mathbb{R}$	Prescribed SH canopy flux (at top)	K m s^{-1}
wqt_can	0	$x \in \mathbb{R}$	Prescribed LE canopy flux (at top)	kg kg^{-1} m s^{-1}
wsv_can(1:100)	0	$x \in \mathbb{R}$	Prescribed scalar flux (at top)	ppb m s^{-1}
wth_total	.false.	$x \in \{.false., .true.\}$	If true, wth_can is including the surface flux	-
wqt_total	.false.	$x \in \{.false., .true.\}$	If true, wqt_can is including the surface flux	-
wsv_total(1:100)	.false.	$x \in \{.false., .true.\}$	If true, wth_sv is including the surface flux	-
wth_alph	0	$x \in \mathbb{R}$	Decay constant for SH with integrated PAD	-
wqt_alph	0	$x \in \mathbb{R}$	Decay constant for LE with integrated PAD	-
wsv_alph(1:100)	0	$x \in \mathbb{R}$	Decay constant for scalar fluxes with integrated PAD	-

2.2.5 Namelist NAMCAPE

Option	Default	Possible values	Description	Unit
lcape	.false.	$x \in \{.false., .true.\}$	Switch to turn CAPE crosssections on and off	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s

2.2.6 Namelist NAMCHECKSIM

Option	Default	Possible values	Description	Unit
tcheck	0	$x \in \mathbb{R}, \quad x \geq 0$	Time interval between checks of velocity divergence and Courant numbers	s

2.2.7 Namelist NAMCHEM

Option	Default	Possible values	Description	Unit
lchem	.false.	$x \in \{$.false., .true.$\}$	Switch to turn chemistry on and off	-
tnor	-	$x \in \mathbb{N}, \quad x \geq N_{\text{reactions}}$	Number of chemical reactions	-
firstchem	1	$x \in \mathbb{N}, \quad 1 \leq x \leq$ lastchem	Column number in scalar.inp of first chemical	-
lastchem	nsv	$x \in \mathbb{N}, \quad$ firstchem $\leq x \leq$ nsv	Column number in scalar.inp of last chemical	-
ldiuvar	.false.	$x \in \{$.false., .true.$\}$	Switches diurnal photolysis reaction rates	-
h_ref	12	$x \in \mathbb{R}, \quad 0 \leq x < 24$	Hour used to calculate photolysis rates if ldiuvar = .false.	h
lcloudKconst	.false.	$x \in \{$.false., .true.$\}$	Switch to make photolysis reaction rates independent of cloud presence if .true.	-
lchconst	.false.	$x \in \{$.false., .true.$\}$	Reaction rates are based on t_ref p_ref and q_ref instead of calculated T, p and q if .true.	-
t_ref	298	$x \in \mathbb{R}, \quad x \geq 0$	Reference temperature	K
q_ref	5.e-3	$x \in \mathbb{R}, \quad x \geq 0$	Reference humidity	kg kg^{-1}
p_ref	100000	$x \in \mathbb{R}, \quad x > 0$	Reference pressure	Pa
lchmovie	.false.	$x \in \{$.false., .true.$\}$	Switch for extra output to make movies	-
dtchmovie	60	$x \in \mathbb{R}, \quad x > 0$	Time interval to write extra output	s
lsegr	.false.	$x \in \{$.false., .true.$\}$	Switch for information about segregation in a Mixed Layer approach	-

2.2.8 Namelist NAMCLOUDFIELD

Option	Default	Possible values	Description	Unit
lcloudfield	.false.	$x \in \{.false., .true.\}$	Switch for cloud field calculations	-
laddinfo	.false.	$x \in \{.false., .true.\}$	Switch to enable writing of q_l and w values	-
dtav	dtav_glob	$x = n \cdot \mathrm{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s

2.2.9 Namelist NAMCROSSSECTION

Option	Default	Possible values	Description	Unit
lcross	.false.	$x \in \{.false., .true.\}$	Switch for dumping of crosssections of the field	-
lbinary	.false.	$x \in \{.false., .true.\}$	Switch to dump crosssections in binary files	-
lxy	.true.	$x \in \{.false., .true.\}$	Enable horizontal xy crosssection	-
lxz	.true.	$x \in \{.false., .true.\}$	Enable vertical xz crosssection	-
lyz	.true.	$x \in \{.false., .true.\}$	Enable vertical yz crosssection	-
dtav	dtav_glob	$x = n \cdot \mathrm{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
crossheight(1:100)	1: $x = 2$	$x \in \mathbb{N}, \quad 1 \leq x \leq \mathrm{kmax}$	Heights of the horizontal crosssection	-
crossplane	2	$x \in \mathbb{N}, \quad 1 \leq x \leq \mathrm{jtot}/N_{\mathrm{processors}}$	List of locations of vertical (xz) planes	-
crossortho	2	$x \in \mathbb{N}, \quad 1 \leq x \leq \mathrm{itot}$	List of locations of vertical (yz) planes	-

2.2.10 Namelist NAMDE

Option	Default	Possible values	Description	Unit
SSA	0.999	$x \in \mathbb{R}, \quad 0 \leq x \leq 1$	Representative single scattering albedo	-
laero	.false.	$x \in \{.false., .true.\}$	Switch to use aerosols instead of clouds for Delta-Eddington calculations	-

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Option	Default	Possible values	Description	Unit
iDE	1	$x \in \mathbb{N}^*, x \leq$ nsv	Scalar field used as aerosols if laero set to .true.	-

2.2.11 Namelist NAMFIELDDUMP

Option	Default	Possible values	Description	Unit
lfielddump	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for dumping of 3d-fields	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
lbinary	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch to dump crosssections in binary files	-
ldiracc	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch to dump into binary direct access files instead of Fortran unformatted files	-
klow	1	$x \in \mathbb{N}, \quad 1 \leq x \leq \text{khigh}$	Lowest level of the 3d-field output	-
khigh	$kmax$	$x \in \mathbb{N}, \quad \text{klow} \leq x \leq \text{kmax}$	Highest level of the 3d-field output	-
ncoarse	1	$x \in \mathbb{N}, \quad x \geq 1$	Factor by which to reduce (sample) the 3d-field to be written (in each horizontal direction)	-
tmin	0.0	$x \in \mathbb{R}, \quad x \geq 0$	Start time of field dump	s
tmax	10^8	$x \in \mathbb{R}, \quad x \geq 0$	End time of field dump	s
lu	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save u	-
lv	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save v	-
lw	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save w	-
lqt	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save q_t	-
lql	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save q_l	-
lthl	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save θ_l	-
lbuoy	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	Save buoyancy field	-
lsv	.true.	$x \in \{.\text{false.}, .\text{true.}\}$	List of booleans for saving sv001, sv002, ...	-
lcli	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the cli field	-
lclw	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the clw field	-
lta	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the ta field	-
lplw	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the plw field	-
lpli	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the pli field	-
lhus	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the hus field	-
lhur	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the hur field	-
ltntr	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the tntr field	-
ltntrs	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the tntrs field	-
ltntrl	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	save the tntrl field	-

2.2.12 Namelist NAMGENSTAT

Option	Default	Possible values	Description	Unit
lstat	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for calculating generic slabaveraged statistics	-

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Option	Default	Possible values	Description	Unit
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.13 Namelist NAMHETEROSTATS

Option	Default	Possible values	Description	Unit
lheterostats	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for calculating generic x-averaged statistics	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
ncklimit	kmax	$x \in \mathbb{N}^*, \quad x \leq \text{kmax}$	Maximum height index for which x-averages are calculated and written	-

2.2.14 Namelist NAMLSMCROSSSECTION

Option	Default	Possible values	Description	Unit
lcross	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch to activate dumping of projections in the land surface layer	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
crossheight	2	$x \in \mathbb{N}^*, \quad x \leq 4$	Height of the xy-projection	-
crossplane	2	$x \in \mathbb{N}^*, \quad x \leq \frac{\text{jtot}}{\text{nprocy}}$	Position of the xz-plane on every processor	-

2.2.15 Namelist NAMLSMSTAT

Option	Default	Possible values	Description	Unit
lstat	.false.	$x \in \{.\text{false.}, .\text{true.}\}$	Switch for calculating land surface statistics	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s

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Option	Default	Possible values	Description	Unit
timeav	timeav_glob	$x = n \cdot \mathrm{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.16 Namelist NAMMICROPHYSICS

Option	Default	Possible values	Description	Unit
imicro	0	$x \in \{0, 1, 2, 3, 5, 10\}$	Flag for the microphysical scheme: 0 = No microphysics (all-or-nothing scheme) 1 = Drizzle microphysics 2 = Bulk microphysics 3 = Bin microphysics (inactive) 5 = Simple ice microphysics 10 = User defined microphysics. Can only be used for certain cases (using the file moduser.f90)	-
l_sb	.true.	$x \in \{.false., .true.\}$	Switch for KK00 (Khairoutdinov and Kogan, 2000) or SB (Seifert and Beheng, 2001, 2006) scheme resp.	-
l_sedc	.true.	$x \in \{.false., .true.\}$	Switch for cloud droplet sedimentation	-
l_rain	.true.	$x \in \{.false., .true.\}$	Switch for rain formation and evolution	-
l_mur_cst	.false.	$x \in \{.false., .true.\}$	Switch for a constant value of μ_r (in raindrop gamma distribution)	-
l_berry	.true.	$x \in \{.false., .true.\}$	Berry-Hsie autoconversion instead of Kessler-Lin	-
l_graupel	.true.	$x \in \{.false., .true.\}$	Switch for graupel	-
l_warm	.false.	$x \in \{.false., .true.\}$	Check: rune ice micro in warm mode	-
mur_cst	5	$x \in \mathbb{R}, \quad x > 0$	Value for μ_r, a shape parameter for the rain drop number density distribution (used only if l_mur_cst = .true.)	-
Nc_0	70e6	$x \in \mathbb{R}, \quad x \geq 0$	Initial number of cloud droplets	-
sig_g	1.34	$x \in \mathbb{R}, \quad x \geq 0$	Geometric standard deviation of the cloud droplet drop size distribution	-
sig_gr	1.5	$x \in \mathbb{R}, \quad x \geq 0$	Geometric standard deviation of the rain droplet drop size distribution	-
courantp	1.0	$x \in \mathbb{R}, \quad x > 0$	CFLmax-criterion for precipitation	-

2.2.17 Namelist NAMNETCDFSTATS

Option	Default	Possible values	Description	Unit
lnetcdf	.true.	$x \in \{.false., .true.\}$	Switch to write NetCDF output	-
lsync	.false.	$x \in \{.false., .true.\}$	Switch to synchronize NetCDF files after writing	-

2.2.18 Namelist NAMNUDGE

Option	Default	Possible values	Description	Unit
lnudge	.false.	$x \in \{.false., .true.\}$	Switch to activate/deactivate nudging	-
tnudgefac	1	$x \in \mathbb{R}, \quad x > 0$	Nudgefactor	-

2.2.19 Namelist NAMquadrant

Option	Default	Possible values	Description	Unit
lquadrant	.false.	$x \in \{.false., .true.\}$	Switch to enable quadrant-hole analysis	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	dtav	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s
hole	0	$x \in \mathbb{R}, \quad x \geq 0$	Hole size of Q-H analysis	-
iwind	1	$x \in \{1, 2, 3\}$	Flag for which wind speed determines quadrant: 1: u 2: v 3: $\sqrt{u^2 + v^2}$	-
klow	2	$x \in \mathbb{N}, \quad 2 \leq x \leq \text{khigh}$	Lowest (half) level evaluated in Q-H analysis	-
khigh	kmax	$x \in \mathbb{N}, \quad x \leq \text{kmax}$	Highest (half) level evaluated in Q-H analysis	-

2.2.20 Namelist NAMRADIATION

This namelist is only used if the Rapid Radiative Transfer Model for GCMs (RRTMG) is applied, i.e. iradiation = 4.

Option	Default	Possible values	Description	Unit
lCnstZenith	.false.	$x \in \{.false., .true.\}$	Switch to apply a fixed solar zenith angle	-
cnstZenith	0	$x \in \mathbb{R}, \quad \lvert x \rvert \leq 90$	Solar zenith angle if lCnstZenith = .true.	°
lCnstAlbedo	.true.	$x \in \{.false., .true.\}$	Switch to apply the constant albedoav as albedo instead of the parameterization in RRTMG	-
ioverlap	2	$x \in \{0, 1, 2, 3\}$	Flag for cloud overlap method: 0: Clear only 1: Random 2: Maximum/random 3: Maximum	-
inflglw	2	$x \in \{0, 1, 2\}$	Flag for RRTMG input: 0: Cloud fraction & optical depth 1: Cloud fraction & liquid water path 2: Cloud fraction & liquid water path & ice fraction	-
iceflglw	3	$x \in \{0, 1, 2, 3\}$	Flag for ice particle specification: Detailed information under "iceflag" in rrtmg_lw_cldprop.f90	-
liqflglw	1	$x \in \{0, 1\}$	Flag for effect of liquid water: 0: optical depth computed as in CCM3 1: optical depth due to water clouds computed using water droplet effective radius input	-
inflgsw	2	$x \in \{0, 1, 2\}$	Flag for RRTMG input: 0: Cloud fraction & optical depth 1: Cloud fraction & liquid water path 2: Cloud fraction & liquid water path & ice fraction	-

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Option	Default	Possible values	Description	Unit
iceflgsw	3	$x \in \{1, 2, 3\}$	Flag for ice particle specification: Detailed information under "iceflag" in rrtmg_lw_cldprop.f90	-
liqflgsw	1	$x \in \{0, 1\}$	Flag for effect of liquid water: 0: optical depth computed as in CCM3 1: optical depth due to water clouds computed using water droplet effective radius input	-
ocean	.false.	$x \in \{$.false., .true.$\}$	Switch to calculate radiation over ocean	-
usero3	.false.	$x \in \{$.false., .true.$\}$	Switch to take O_3 profile from backrad.inp instead of standard profile	-
co2_fraction	-1	$x \in \mathbb{R}, \quad x \geq 0$	If given, CO2 volume fraction is set to this value for RRTMG	-
ch4_fraction	-1	$x \in \mathbb{R}, \quad x \geq 0$	If given, CH4 volume fraction is set to this value for RRTMG	-
n2o_fraction	-1	$x \in \mathbb{R}, \quad x \geq 0$	If given, N2O volume fraction is set to this value for RRTMG	-
doperpetual	.false.	$x \in \{$.false., .true.$\}$	Switch to not use a diurnal cycle (code not yet inserted if .true.; highly recommended not to enable)	-
doseasons	.true.	$x \in \{$.false., .true.$\}$	Switch to account for changes in Earth's position from day to day (code not correct if .false.; highly recommended not to disable)	-
iyear	1992	$x \in \mathbb{Z}$	Year of the simulation	-

2.2.21 Namelist NAMRADSTAT

Option	Default	Possible values	Description	Unit
lstat	.false.	$x \in \{.false., .true.\}$	Switch for calculating slabaveraged radiation statistics	-
lradclearair	.false.	$x \in \{.false., .true.\}$	Another switch for calculating slabaveraged radiation statistics	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.22 Namelist NAMRADFIELD

Option	Default	Possible values	Description	Unit
lradfield	.false.	$x \in \{.false., .true.\}$	Switch to turn 2D radiation field output	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.23 Namelist NAMMSEBUDG

Option	Default	Possible values	Description	Unit
lmsebudg	.false.	$x \in \{.false., .true.\}$	Switch to turn on moist static energy budget output	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of variance budget	s

2.2.24 Namelist NAMSAMPLING

Option	Default	Possible values	Description	Unit
dtav	dtav_glob	$x = n \cdot \mathrm{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \mathrm{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s
lsampcl	.false.	$x \in \{$.false., .true.$\}$	Switch for conditional sampling cloud ($q_l > 0$)	-
lsampco	.false.	$x \in \{$.false., .true.$\}$	Switch for conditional sampling cloud core ($q_l > 0, \theta_v' > 0$)	-
lsampup	.false.	$x \in \{$.false., .true.$\}$	Switch for conditional sampling updrafts ($w > 0$)	-
lsampbuup	.false.	$x \in \{$.false., .true.$\}$	Switch for conditional sampling of buoyant updrafts ($w > 0, \theta_v' > 0$)	-
lsampcldup	.false.	$x \in \{$.false., .true.$\}$	Switch for conditional sampling cloudy updrafts ($q_l > 0, w > 0$)	-
lsamptend	.false.	$x \in \{$.false., .true.$\}$	Switch for conditional sampling of tendencies	-

2.2.25 Namelist NAMSIMPLEICESTAT

Option	Default	Possible values	Description	Unit
lmicrostat	.false.	$x \in \{$.false., .true.$\}$	Switch for simple ice microphysics statistics calculation	-
dtav	dtav_glob	$x = n \cdot \mathrm{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \mathrm{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.26 Namelist NAMSTATTEND

Option	Default	Possible values	Description	Unit
ltend	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for calculation of tendencies of prognostic variables	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.2.27 Namelist NAMSURFACE

Option	Default	Possible values	Description	Unit
isurf	-1	$x \in \{1, 2, 3, 4, 10\}$	Overrides isurf flag of Namelist PHYSICS if used.	-
lmostlocal	.false.	$x \in \{.false., .true.\}$	Switch to locally determine Obukhov length	-
lsmoothflux	.false.	$x \in \{.false., .true.\}$	Switch to create uniform sensible and latent heat flux over domain	-
lneutral	.false.	$x \in \{.false., .true.\}$	Switch to disable stability corrections	-
z0	-1		Obsolete	
z0mav	-1	$x \in \mathbb{R}, \quad x > 0$	Roughness length of momentum	m
z0hav	-1	$x \in \mathbb{R}, \quad x > 0$	Roughness length of heat	m
thls	-1	$x \in \mathbb{R}, \quad x > 0$	Surface liquid water potential temperature	K
ps	-1	$x \in \mathbb{R}, \quad x > 0$	Surface pressure	Pa
ustin	-1	$x \in \mathbb{R}, \quad x \geq 0$	Prescribed friction velocity	$\mathrm{m\,s^{-1}}$
wtsurf	-1	$x \in \mathbb{R}$	Prescribed kinematic temperature flux	$\mathrm{K\,m\,s^{-1}}$
wqsurf	-1	$x \in \mathbb{R}$	Prescribed kinematic moisture flux	$\mathrm{kg\,kg^{-1}\,m\,s^{-1}}$
wsvsurf(1:nsv)	0	$x \in \mathbb{R}[100]$	Prescribed surface scalar flux	$\mathrm{ppb\,m\,s^{-1}}$
min_horv	0.1	$x \in \mathbb{R}, \quad x \geq 0$	Minimum surface wind velocity for drag calculation	$\mathrm{m\,s^{-1}}$
tsoilav	-	$x \in \mathbb{R}[4], \quad x[i] > 0$	Initial soil temperature (for 4 layers, only used if isurf = 1)	K
tsoildeepav	-	$x \in \mathbb{R}, \quad x > 0$	Soil bottom temperature (if isurf = 1)	K
phiwav	-	$x \in \mathbb{R}[4]$, $0 \leq x[i] \leq 0.472$	Soil moisture (if isurf = 1 and preferably below 0.323)	$\mathrm{m^3\,m^{-3}}$
rootfav	-	$x \in \mathbb{R}[4]$, $0 \leq x[i] \leq 1$, $\sum_i x[i] = 1$	Root fraction (if isurf = 1)	-
Cskinav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Heat capacity skin layer (if isurf = 1)	$\mathrm{J\,K^{-1}\,m^{-2}}$
lambdaskinav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Heat conductivity skin layer (if isurf = 1)	$\mathrm{J\,s^{-1}\,K^{-1}\,m^{-2}}$
albedoav	-1	$x \in \mathbb{R}, \quad 0 \leq x \leq 1$	Albedo (if isurf = 1)	-
Qnetav	-1	$x \in \mathbb{R}$	Net radiation (if iradiation $\neq$ 1 and isurf = 1)	$\mathrm{J\,s^{-1}\,m^{-2}}$

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Option	Default	Possible values	Description	Unit
cvegav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Vegetation cover	-
Wlav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Initial water cover on vegetation	m
rsminav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Minimal vegetation resistance (if isurf = 1)	s m^{-1}
rssoilminav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Minimum soil evaporation resistance	-
LAIav	-1	$x \in \mathbb{R}, \quad x \geq 0$	Leaf area index (if isurf = 1)	m^2 m^{-2}
gDav	-	$x \in \mathbb{R}, \quad x \geq 0$	Correction for evaporation of tall vegetation (if isurf = 1)	-
rsisurf2	0	$x \in \mathbb{R}, \quad x \geq 0$	Vegetation resistance (if isurf = 2)	s m^{-1}
lhetero	.false.	$x \in \{.false., .true.\}$	Switch to apply heterogeneous surfaces	-
xpatches	2	$x \in \mathbb{N}, \quad 1 \leq x \leq 16$	Amount of patches in the x-direction	-
ypatches	1	$x \in \mathbb{N}, \quad 1 \leq x \leq 16$	Amount of patches in the y-direction	-
land_use(1:16,1:16)	0	$x \in \mathbb{N}, \quad 1 \leq x \leq 10$	Indicator for the land type	-
loldtable	.false.	$x \in \{.false., .true.\}$	Switch to use surface.inp.xxx instead of updated surface.<name>.inp.xxx	-
lrsags	.false.	$x \in \{.false., .true.\}$	Switch to use A-g_s for resistance calculations (if isurf = 1)	-
lCO2Ags	.false.	$x \in \{.false., .true.\}$	Switch to calculate CO_2 fluxes with A-g_s (if lrsAgs = .true.)	-
planttype	3	$x \in \{3, 4, 5\}$	Switch between C3 and C4 plants for A-g_s: 3: C3 plants 4: C4 plants with standard settings 5: C4 plants for which T2gm and Q10gm need to be set in the namelist and R10 can be changed from its default value using the namelist	-

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Option	Default	Possible values	Description	Unit
lrelaxgc	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch to nudge towards calculated conductivity instead of instantaneous adaptation	-
kgc	0.00113	$x \in \mathbb{R}, \quad 0 < x \leq$ dtmax^{-1}	Response rate for stomatal conductivity	s^{-1}
lrelaxci	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch to nudge towards calculated internal CO_2 concentration instead of instantaneous adaptation	-
kci	0.00113	$x \in \mathbb{R}, \quad 0 < x \leq$ dtmax^{-1}	Response rate for internal CO_2 concentration	s^{-1}
phi	0.472	$x \in \mathbb{R}, \quad x > 0$	volumetric soil porosity	-
phifc	0.323	$x \in \mathbb{R}, \quad x > 0$	volumetric moisture at field capacity	-
phiwp	0.171	$x \in \mathbb{R}, \quad x > 0$	volumetric moisture at wilting point	-
R10	0.23	$x \in \mathbb{R}, \quad x > 0$	Respiration at 10 °C	$\mathrm{mg\,m^{-2}\,s^{-1}}$
T2gm	301.0	$x \in \mathbb{R}, \quad x > 0$	Reference temperature to calculate the mesophyll conductance	K
Q10gm	2.0	$x \in \mathbb{R}, \quad x > 0$	Parameter to calculate the mesophyll conductance	-
lsplitleaf	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch to split A-g_s calculations over different parts of the leaf	-
i_expemis	-1	$x \in \mathbb{N}$	If $0 <$ i_expemis $\leq$ nsv, an exponential emission profile is applied for scalar index i_expemis of the form $E_0 e^{-\frac{1}{2}\left(\frac{t-E_1}{E_2}\right)^2}$ with t the amount of seconds since the start of the simulation	-
expemis0	0.0	$x \in \mathbb{R}$	Maximum exponential emission, E_0	$\mathrm{ppb\,m\,s^{-1}}$
expemis1	0.0	$x \in \mathbb{R}$	Time of maximum exponential emission, E_1	s
expemis2	10800.0	$x \in \mathbb{R}$	Timescale of exponential emission, E_2	s

2.2.28 Namelist NAMTESTBED

Option	Default	Possible values	Description	Unit
ltestbed	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for testbed functionality	-
ltb_nudge	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for testbed nudging	-
tb_taunudge	10800.	$x \in \mathbb{R}, \quad x > 0$	Nudging timescale	s

2.2.29 Namelist NAMTIMESTAT

Option	Default	Possible values	Description	Unit
ltimestat	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for calculation of time series	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
iblh_var	-1	$x \in \{-1, -2, -3\}$	Flag for the variable used to calculate boundary-layer height: -1 = virtual pot. temp. θ_v -2 = liquid water pot. temp. θ_l -3 = total humidity q_t	-
iblh_meth	2	$x \in \{1, 2, 3\}$	Flag for the method used to calculate boundary-layer height: 1 = use flux of selected variable 2 = use gradient of selected variable 3 = use a threshold (auto or user specified)	-
blh_thres	-1	$x \in \mathbb{R}, \quad x \geq 0$	Threshold for the selected variable, used only for iblh_thres method	K or kg kg^{-1}
blh_nsamp	4	$x \in \mathbb{N}^*, \quad x \leq \text{kmax}$	Number of levels to integrate over	-

2.3 Addon modules

2.3.1 Namelist NAMPARTICLES

Option	Default	Possible values	Description	Unit
lpartic	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch to enable/disable this routine	-
lpartsgs	.true.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for subgrid diffusion	-
intmeth	3	$x \in \{0, 3\}$	Flag for time integration scheme 0 = particles stand still 3 = Adams-Bashfort second order scheme	-
lstat	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for particle statistics	-
dtav	60	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	3600	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s
ldump	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for dump of particle field	-
timedump	3600	$x \in \mathbb{R}, \quad x > 0$	Time interval for particle field dump	s
npartdump	10	$x \in \mathbb{N}, \quad 0 \leq x \leq 10$	Number of variables written at $timedump$, in order: x, y, z, u, v, w, θ_l, θ_v, q_t, q_l	-

2.3.2 Namelist NAMprojection

Old version of modcrosssection (Paragraph 2.2.9). Usage of modprojection is not advised.

Option	Default	Possible values	Description	Unit
lproject	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch to activate dumping of projections of the field	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
projectheight	2	$x \in \mathbb{N}^*, \quad x \leq \text{kmax}$	Height of the xy-projection	-

2.3.3 Namelist NAMSTRESS

Option	Default	Possible values	Description	Unit
lstress	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for turbulent stress budget	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

2.3.4 Namelist NAMTILT

Option	Default	Possible values	Description	Unit
ltilted	.false.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for a tilted boundary layer	-
alfa	0	$x \in \mathbb{R}, \quad -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$	Tilt angle	rad
lstat	.true.	$x \in \{.\text{false}., .\text{true}.\}$	Switch for statistics	-
dtav	dtav_glob	$x = n \cdot \text{dtmax}, \quad n \in \mathbb{N}^*$	Time interval for sampling of statistics	s
timeav	timeav_glob	$x = n \cdot \text{dtav}, \quad n \in \mathbb{N}^*$	Time interval for writing statistics	s

Bibliography

T. Heus, C. van Heerwaarden, and J. van der Dussen. *Dutch Atmospheric Large Eddy Simulation: user manual*, November 2009.

M. Khairoutdinov and Y. Kogan. A new cloud physics parametrization in a large-eddy simulation model of marine stratocumulus. *Monthly Weather Review*, 128:229–243, 2000.

A. Seifert and K.D. Beheng. A double-moment parameterization for simulating autoconversion, accretion and selfcollection. *Atmospheric Research*, 59-60:265–281, 2001.

A. Seifert and K.D. Beheng. A two-moment cloud microphysics parameterization for mixed-phase clouds. part 1:model description. *Meteorology and Atmospheric Physics*, 92:45–66, 2006.