A brief guide to cGENIE parameters ('namelists')

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Parameters in the model are controlled via 'namelists'. The default parameter values are listed in the following Tables. To effect a change in parameter value, the parameter name is simply assigned the new value, typically in the user config file. Namelist settings can simply be edited in the user config file if they are already present, or a namelist assignment can be added (either under a relevant heading, or at the bottom of the file - it does not matter). The assignment takes the form: namelist = value
Note that where the value is a string, the syntax is:
`namelist = 'string'` The syntax for logical (true/false) assignments is:
`namelist = .true. (or namelist = .false.)`

For selecting (or de-selecting) atmospheric tracers, the syntax is: gm_atm_select_n = .true. where n is the index of the tracer as detailed in the Tables. For ocean and sediment (particulate) tracers, the namlist names take the same form except with 'ocn' or 'sed' in the namlist parameter name.

NOTE: If the number of selected tracers in the ocean is changed, so to must the value of GOLDSTEINNTRACSOPTS, which sets the array dimensions in the ocean and the number of tracers that must be advected, convected, and diffused in the ocean. For example, for 16 selected ocean tracers (including temperature and salinity), add the line: GOLDSTEINNTRACSOPTS = '$(DEFINE)GOLDSTEINNTRACS=16'

For setting initial values of atmospheric tracers, the syntax is: gm_atm_init_n = 278.0E-6
where again, n is the index of the tracer (detailed below). Ocean tracers are initialized similarly.
NOTE: There is no user-configurable initialization of deep-sea sediment composition (in SEDGEM).

		SELECTION gm_atm_select_n		INITILIZATION ac_atm_init_n		
TRACER MNEMONIC	INDEX n	DEFAULT VALUE	UNITS	DEFAULT VALUE	UNITS	TRACER DESCRIPTION
ATMOSPHERIC (GASEOUS) TRACERS						
ia_temp	1	.true.	logical	n/a (0.0)	K	surface air temperature
ia_humidity	2	.true.	logical	n/a (0.0)		specific humidity
ia_pCO2	3	.false.	logical	0.0	atm	carbon dioxide (CO_2)
ia_pCO2_13C	4	.false.	logical	0.0	‰	$d^{13}C$ of CO_2
ia_pCO2_14C	5	.false.	logical	0.0	‰	$d^{14}C$ of CO_2
ia_pO2	6	.false.	logical	0.0	atm	oxygen (O_2)
ia_pO2_18O	7	.false.	logical	0.0	‰	^{18}O of O_2
ia_pN2	8	.false.	logical	0.0	atm	nitrogen (N_2)
ia_pN2_15N	9	.false.	logical	0.0	‰	^{15}N of N_2
ia_pCH4	10	.false.	logical	0.0	atm	methane (CH_4)
ia_pCH4_13C	11	.false.	logical	0.0	‰	^{13}C of CH_4
ia_pCH4_14C	12	.false.	logical	0.0	‰	^{14}C of CH_4
ia_pSF6	13	.false.	logical	0.0	atm	sulphur hexafloride (SF6)
ia_pN2O	14	.false.	logical	0.0	atm	nitrous oxide (N_2O)
ia_pN2O_15N	15	.false.	logical	0.0	‰	^{15}N of N_2O
ia_pH2S	16	.false.	logical	0.0	atm	hydrogen sulphide (H_2S)
ia-pH2S_34S	17	.false.	logical	0.0	‰	^{32}S of H_2S
ia_pCFC11	18	.false.	logical	0.0	atm	CFC-11
ia_pCFC12	19	.false.	logical	0.0	atm	CFC-12

		SELECTION gm_ocn_select_n		INITILIZATION bg_ocn_init_n		
TRACER MNEMONIC	INDEX n	DEFAULT VALUE	UNITS	DEFAULT VALUE	UNITS	TRACER DESCRIPTION
OCEAN (DISSOLVED) TRACERS						
io_temp	1	.true.	logical	n/a (0.0)	K	temperature
io_sal	2	.true.	logical	n/a (0.0)	PSU	salinity
io_DIC	3	.false.	logical	0.0	mol kg^{-1}	dissolved inorganic carbon (DIC)
io_DIC_13C	4	.false.	logical	0.0	‰	$d^{13}C$ of DIC
io_DIC_14C	5	.false.	logical	0.0	‰	$d^{14}C$ of DIC
io_NO3	6	.false.	logical	0.0	mol kg^{-1}	dissolved nitrate (NO_3)
io_NO3_15N	7	.false.	logical	0.0	‰	$d^{15}N$ of NO_3
io_PO4	8	.false.	logical	0.0	mol kg^{-1}	dissolved phosphate (PO_4)
io_Fe	9	.false.	logical	0.0	mol kg^{-1}	dissolved iron (Fe)
io_O2	10	.false.	logical	0.0	mol kg^{-1}	dissolved oxygen (O_2)
io_O2_18O	11	.false.	logical	0.0	‰	$d^{18}O$ of O_2
io_ALK	12	.false.	logical	0.0	mol kg^{-1}	alkalinity (ALK)
io_SiO2	13	.false.	logical	0.0	mol kg^{-1}	aqueous silicic acid (H_4SiO_4)
io_SiO2_30Si	14	.false.	logical	0.0	‰	$d^{30}Si$ of H_4SiO_4
io_DOM_C	15	.false.	logical	0.0	mol kg^{-1}	dissolved organic matter (DOM);
io_DOM_C_13C	16	.false.	logical	0.0	‰	$d^{13}C$ of DOM-C
io_DOM_C_14C	17	.false.	logical	0.0	‰	$d^{14}C$ of DOM-C
io_DOM_N	18	.false.	logical	0.0	mol kg^{-1}	dissolved organic matter; nitrogen
io_DOM_N_15N	19	.false.	logical	0.0	‰	$d^{15}N$ of DOM-N
io_DOM_P	20	.false.	logical	0.0	mol kg^{-1}	dissolved organic matter; P
io_DOM_Cd	21	.false.	logical	0.0	mol kg^{-1}	dissolved organic matter; cadmium
io_DOM_Cd_114Cd	52	.false.	logical	0.0	mol kg^{-1}	$d^{114}Cd$ of DOM-Cd
io_DOM_Fe	22	.false.	logical	0.0	mol kg^{-1}	dissolved organic matter; iron
io_FeL	23	.false.	logical	0.0	mol kg^{-1}	ligand-bound Fe
io_L	24	.false.	logical	0.0	mol kg^{-1}	free ligand (iron binding)
io_CH4	25	.false.	logical	0.0	mol kg^{-1}	dissolved methane (CH_4)
io_CH4_13C	26	.false.	logical	0.0	‰	$d^{13}C$ of CH_4
io_CH4_14C	27	.false.	logical	0.0	‰	$d^{14}C$ of CH_4
io_NH4	28	.false.	logical	0.0	mol kg^{-1}	dissolved ammonium (NH_4)
io_NH4_15N	29	.false.	logical	0.0	‰	d^{15} of NH_4
io_N2	30	.false.	logical	0.0	mol kg^{-1}	dissolved nitrogen (N_2)
io_N2_15N	31	.false.	logical	0.0	‰	d^{15} of N_2
io_N2O	32	.false.	logical	0.0	mol kg^{-1}	dissolved nitrous oxide (N_2O)
io_N2O_15N	33	.false.	logical	0.0	‰	d^{15} of N_2O
io_Cd	34	.false.	logical	0.0	mol kg^{-1}	dissolved cadmium (Cd)
io_Cd_114	51	.false.	logical	0.0	‰	dissolved cadmium (Cd)
io_Ca	35	.false.	logical	0.0	mol kg^{-1}	dissolved calcium (Ca)
io_B	36	.false.	logical	0.0	mol kg^{-1}	dissolved boron (B)
io_F	37	.false.	logical	0.0	mol kg^{-1}	dissolved florine (F)
io_SO4	38	.false.	logical	0.0	mol kg^{-1}	dissolved sulphate (SO_4)
io_SO4_34S	39	.false.	logical	0.0	‰	d^{32} of SO_4
io_H2S	40	.false.	logical	0.0	mol kg^{-1}	dissolved hydrogen sulphide (H^2)
io_H2S_34S	41	.false.	logical	0.0	‰	d^{32} of H^2
io_Ge	42	.false.	logical	0.0	mol kg^{-1}	dissolved germanium
io_231Pa	43	.false.	logical	0.0	mol kg^{-1}	^{231}Pa
io_230Th	44	.false.	logical	0.0	mol kg^{-1}	^{230}Th
io_CFC11	45	.false.	logical	0.0	mol kg^{-1}	dissolved CFC-11
io_CFC12	46	.false.	logical	0.0	mol kg^{-1}	dissolved CFC-12
io_SF6	47	.false.	logical	0.0	mol kg^{-1}	dissolved sulphur hexafloride (SF6

		SELECTION gm_ocn_select_n		INITILIZATION bg_ocn_init_n		
TRACER MNEMONIC	INDEX n	DEFAULT VALUE	UNITS	DEFAULT VALUE	UNITS	TRACER DESCRIPTION
OCEAN (DISSOLVED) TRACERS continued						
io_colr	48	.false.	logical	0.0	n/a	RED numerical (color) tracer
io_colb	49	.false.	logical	0.0	n/a	BLUE numerical (color) tracer
io_Mg	50	.false.	logical	0.0	mol kg^{-1}	dissolved magnesium (Mg)
io_Li	53	.false.	logical	0.0	mol kg^{-1}	dissolved lithium (Li)
io_li_7	54	.false.	logical	0.0	‰	^{7}Li of Li
io_Nd	55	.false.	logical	0.0	mol kg^{-1}	dissolved neodymium (Nd)
io_Nd_144	56	.false.	logical	0.0	‰	^{144}Nd of Nd

		SELECTION gm_sed_select_n		INITILIZATION		
TRACER MNEMONIC	INDEX n	DEFAULT VALUE	UNITS	DEFAULT VALUE	UNITS	TRACER DESCRIPTION
SEDIMENT (SOLID, PARTICULATE) TRACERS						
is_NULL1	1	.false.	logical	n/a	n/a	dummy index
is_NULL2	2	.false.	logical	n/a	n/a	dummy index
is_POC	3	.false.	logical	0.0	wt%	particulate organic carbon (POC)
is_POC_13C	4	.false.	logical	0.0	‰	$d^{13}C$ of POC
is_POC_14C	5	.false.	logical	0.0	‰	$d^{14}C$ of POC
is_PON	6	.false.	logical	0.0	wt%	particulate organic nitrogen (PON
is_PON_15N	7	.false.	logical	0.0	‰	d^{15} of PON
is_POP	8	.false.	logical	0.0	wt%	particulate organic phosphate (POP)
is_POCd	9	.false.	logical	0.0	wt%	particulate organic cadmium (POCd)
is_POCd_114Cd	43	.false.	logical	0.0	‰	$d^{114}Cd$ of POC inorporated cadmium
is_POFe	10	.false.	logical	0.0	wt%	particulate organic iron (POFe)
is_POM_231Pa	11	.false.	logical	0.0	wt%	POM scavenged ^{231}Pa
is_POM_230Th	12	.false.	logical	0.0	wt%	POM scavenged ^{230}Th
is_POM_Fe	13	.false.	logical	0.0	wt%	POM scavenged Fe
is_POM_Nd	47	.false.	logical	0.0	wt%	POM scavenged Nd
is_POM_Nd_144Nd	48	.false.	logical	0.0	‰	POM scavenged ^{144}Nd
is_CaCO3	14	.false.	logical	0.0	wt%	calcium carbonate ($CaCO_3$)
is_CaCO3_13C	15	.false.	logical	0.0	‰	$d^{13}C$ of $CaCO_3$
is_CaCO3_14C	16	.false.	logical	0.0	‰	$d^{14}C$ of $CaCO_3$
is_CaCO3_18O	17	.false.	logical	0.0	‰	$d^{18}O$ of $CaCO_3$
is_CdCO3	18	.false.	logical	0.0	wt%	$CaCO_3$ incorporated cadmium
is_CdCO3_114Cd	44	.false.	logical	0.0	‰	$d^{114}Cd$ of $CaCO_3$ incorporated cadium
is_LiCO3	45	.false.	logical	0.0	wt%	$CaCO_3$ incorporated lithium
is_LiCO3_7Li	46	.false.	logical	0.0	‰	$d^{7}Li$ of $CaCO_3$ incorporated lithium
is_CaCO3_231Pa	19	.false.	logical	0.0	wt%	$CaCO_3$ scavenged ^{231}Pa
is_CaCO3_230Th	20	.false.	logical	0.0	wt%	$CaCO_3$ scavenged ^{230}Th
is_CaCO3_Fe	21	.false.	logical	0.0	wt%	$CaCO_3$ scavenged Fe
is_CaCO3_Nd	49	.false.	logical	0.0	wt%	$CaCO_3$ scavenged Nd
is_CaCO3_Nd_144Nd	50	.false.	logical	0.0	‰	$CaCO_3$ scavenged ^{144}Nd
is_det	22	.false.	logical	0.0	wt%	detrital (refractory) material
is_det_231Pa	23	.false.	logical	0.0	wt%	detrital scavenged ^{231}Pa
is_det_230Th	24	.false.	logical	0.0	wt%	detrital scavenged ^{230}Th
is_det_Fe	25	.false.	logical	0.0	wt%	detrital scavenged Fe
is_det_Nd	51	.false.	logical	0.0	wt%	detrital scavenged Nd
is_det_Nd_144Nd	52	.false.	logical	0.0	‰	detrital scavenged ^{144}Nd
is_det_Li	55	.false.	logical	0.0	wt%	detrital scavanged lithium
is_det_Li_7Li	56	.false.	logical	0.0.	‰	detrital scavenged ^{7}Li
is_opal	26	.false.	logical	0.0	wt%	opal

		SELECTION gm_sed_select_n		INITILIZATION		
TRACER MNEMONIC	INDEX n	DEFAULT VALUE	UNITS	DEFAULT VALUE	UNITS	TRACER DESCRIPTION
SEDIMENT (SOLID, PARTICULATE) TRACERS continued						
is_opal_30Si	27	.false.	logical	0.0	‰	d^{30} of opal
is_opal_Ge	28	.false.	logical	0.0	wt%	opal incorporated germanium
is_opal_231Pa	29	.false.	logical	0.0	wt%	opal scavenged ^{231}Pa
is_opal_230Th	30	.false.	logical	0.0	wt%	opal scavenged ^{230}Th
is_opal_Fe	31	.false.	logical	0.0	wt%	opal scavenged Fe
is_opal_Nd	53	.false.	logical	0.0	wt%	opal scavenged Nd
is_opal_Nd_144Nd	54	.false.	logical	0.0	‰	opal scavenged ^{144}Nd
is_ash	32	.false.	logical	0.0	wt%	ash
is_POC_frac2	33	.false.	logical	0.0	(ratio)	
is_CaCO3_frac2	34	.false.	logical	0.0	(ratio)	
is_opal_frac2	35	.false.	logical	0.0	(ratio)	

		SELECTION gm_sed_select_n		INITILIZATION		
TRACER MNEMONIC	INDEX n	DEFAULT VALUE	UNITS	DEFAULT VALUE	UNITS	TRACER DESCRIPTION
SEDIMENT (SOLID, PARTICULATE)						
is_CaCO3_age	36	.false.	logical	0.0		$CaCO_3$ numerical age tracer
is_foram_p_13C	37	.false.	logical	0.0	‰	planktic foraminiferal $CaCO_3$ $d^{13}C$
is_foram_p_14C	38	.false.	logical	0.0	‰	planktic foraminiferal $CaCO_3$ $d^{14}C$
is_foram_p_18O	39	.false.	logical	0.0	‰	planktic foraminiferal $CaCO_3$ $d^{18}O$
is_foram_b_13C	40	.false.	logical	0.0	‰	benthic foraminiferal $CaCO_3$ $d^{13}C$
is_foram_b_14C	41	.false.	logical	0.0	‰	benthic foraminiferal $CaCO_3$ $d^{14}C$
is_foram_b_18O	42	.false.	logical	0.0	‰	benthic foraminiferal $CaCO_3$ $d^{18}O$

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
TIME STEPPING			
ma_koverall_total		(INTEGER)	overall model number of time-steps[1]
ma_genie_timestep		s	length of each time-step
bg_par_misc_t_start	0.0	years	simulation start year
bg_par_misc_t_runtime	1001.0	years	simulation run length[2]
bg_ctrl_misc_t_BP	.false.	(LOGICAL)	simulation time scale as years Before Present
sg_par_misc_t_runtime	1001.0	yr	simulation run length1
ma_katm_loop	1 [3]	(INTEGER?)	
ma_ksic_loop	5	(INTEGER)	relative frequency of updating of sea-ice
ma_kocn_loop	5	(INTEGER)	relative frequency of updating of ocean
ma_conv_kocn_katchem	5	(INTEGER)	time-stepping ratio between ATCHEM and ocean
ma_conv_kocn_ksedgem	50	(INTEGER)	time-stepping ratio between SEDGEM and ocean
ma_conv_kocn_kbiogem	5	(INTEGER)	time-stepping ratio between BIOGEM and ocean
ma_conv_kocn_krokgem	5	(INTEGER)	time-stepping ratio between ROKGEM and ocean
ma_dt_write	720	(INTEGER)	default interval of output [4]
rg_par_screen_output	200	(INTEGER)	ROKGEM reporting frequency (in ROKGEM time-steps)
ea_3	1000	(INTEGER)	frequency of 'health check' diagnostics reporting[5]
go_3	1000	(INTEGER)	frequency of 'health check' diagnostics reporting5
gs_3	1000	(INTEGER)	frequency of 'health check' diagnostics reporting5
ea_5	100	(INTEGER)	'time series' frequency5
go_5	100	(INTEGER)	'time series' frequency5
gs_5	100	(INTEGER)	'time series' frequency5
ea_6	50000	(INTEGER)	'average' frequency5
go_6	50000	(INTEGER)	'average' frequency5
gs_6	50000	(INTEGER)	'average' frequency5

[1] This parameter sets the 'aging' of pre-existing (i.e., restart) sedimentary material consistent with the duration of a run. It must be equal to the run length of everything else. Obviously ;)

[2] The length of each time-step is determined by the value of ma_genie_timestep (seconds), and is defined in genie_eb_go_gs_ac_bg_sg.config by: ma_genie_timestep = 365.25*24.0/500 * 3600.0, i.e., ma_genie_timestep=63115.2, giving 500 time-steps per year.

[3] This means that the atmosphere (the EMBM in this case) is updated every GENIE time-step.

[4] In multiples of the GENIE time-step. [5] When set equal to ma_genie_timestep+1, this effectively disables this feature.

ARRAY SPECIFICATION: GRID		
NAME	DEFAULT VALUE	DESCRIPTION
GENIENXOPTS	'$(DEFINE)GENIENX=36'	x (i) direction resolution in atmosphere
GENIENYOPTS	'$(DEFINE)GENIENY=36'	y (j) direction resolution in atmosphere
GENIENLOPTS	'$(DEFINE)GENIENL=1'	number of levels in atmosphere
GOLDSTEINNLONSOPTS	'$(DEFINE)GOLDSTEINNLONS=36'	x (i) direction resolution in ocean
GOLDSTEINNLATSOPTS	'$(DEFINE)GOLDSTEINNLATS=36'	y (j) direction resolution in oxcean
GOLDSTEINNLEVSOPTS	'$(DEFINE)GOLDSTEINNLEVS=8'	number of (depth) levels in ocean
SEDGEMNLONSOPTS	'$(DEFINE)SEDGEMNLONS=36'	x (i) direction resolution in sediments
SEDGEMNLATSOPTS	'$(DEFINE)SEDGEMNLATS=36'	y (j) direction resolution in sediments
ROKGEMNLONSOPTS	'$(DEFINE)ROKGEMNLONS=36'	x (i) direction resolution on land surface
ROKGEMNLATSOPTS	'$(DEFINE)ROKGEMNLATS=36'	y (j) direction resolution on land surface
gm_par_grid_lon_offset	-260.0	assumed longitudinal offset of the grid f ATCHEM, BIOGEM, SEDGEM 2- and 3-D field data saving (units of degrees East)
ARRAY SPECIFICATION: NUMBER OF TRACERS		
GOLDSTEINNTRACSOPTS	'$(DEFINE)GOLDSTEINNTRACS=10'	number of dissolved tracers in ocean

NAME	DEFAULT VALUE	DESCRIPTION
RUN RE-START SPECIFICATION		
ea_7	'n'	new/continuing run? (i.e., use restart?)
ea_rstdir_name	'$RUNTIME_ROOT /genie-embm/data/input'	restart (input) directory
ea_35	'tmp.1'	input ASCII restart file name
ea_29	'spn'	output file number (restart file string)
go_7	'n'	new/continuing run? (i.e., use restart?)
go_rstdir_name	'$RUNTIME_ROOT /genie-goldsteindata/input'	restart (input) directory
go_23	'tmp.1'	input ASCII restart file name
go_17	'spn'	output file number (restart file string)
gs_7	'n'	new/continuing run? (i.e., use restart?)
gs_rstdir_name	'$RUNTIME_ROOT /genie-seaice/data/input'	restart (input) directory
gs_18	'tmp.1'	input ASCII restart file name
gs_12	'spn'	output file number (restart file string)
ac_ctrl_continuing	.false.	continuing ATCHEM run? (i.e., use restart?)
ac_par_rstdir_name	'$RUNTIME_ROOT /genie-atchem/data/input'	ATCHEM restart (input) directory
ac_par_infile_name	'atchem'	input restart filename
ac_par_outfile_name	'atchem'	output restart filename
bg_ctrl_continuing	.false.	continuing BIOGEM run? (i.e., use restart?)
bg_par_rstdir_name	'$RUNTIME_ROOT /genie-biogem/data/input'	BIOGEM restart (input) directory
bg_par_infile_name	'biogem'	input restart filename
bg_par_outfile_name	'biogem'	output restart filename
sg_ctrl_continuing	.false.	continuing SEDGEM run? (i.e., use restart?)
sg_par_rstdir_name	'$RUNTIME_ROOT /genie-sedgem/data/input'	SEDGEM restart (input) directory
sg_par_infile_name	'sedgem'	input restart filename
sg_par_outfile_name	'sedgem'	output restart filename
rg_ctrl_continuing	.false.	continuing ROKGEM run? (i.e., use restart?)
-	-	-
rg_par_infile_name	'rokgem'	input restart filename
rg_par_outfile_name	'rokgem'	output restart filename

NAME	DEFAULT VALUE	DESCRIPTION
INPUT/OUTPUT DIRECTORY SPECIFICATION		
gm_par_gem_indir_name	'$RUNTIME_ROOT/ genie-main/data/input'	GEM data input directory
ea_1	'$RUNTIME_ROOT /genie-embm/data/input'	data input directory
ea_2	'$RUNTIME_OUTDIR /embm'	results output directory
go_1	'$RUNTIME_ROOT /genie-goldstein/data/input'	data input directory
go_2	'$RUNTIME_OUTDIR /goldstein'	results output directory
gs_1	'$RUNTIME_ROOT /genie-seaice/data/input'	data input directory
gs_2	'$RUNTIME_OUTDIR /seaice'	results output directory
ac_par_indir_name	'$RUNTIME_ROOT /genie-atchem/data/input'1	ATCHEM data input directory
ac_par_outdir_name	'$RUNTIME_OUTDIR /atchem'	ATCHEM results output directory
bg_par_indir_name	'$RUNTIME_ROOT /genie-biogem/data/input'	BIOGEM data input directory
bg_par_outdir_name	'$RUNTIME_OUTDIR /biogem'	BIOGEM results output directory
bg_par_fordir_name	'$RUNTIME_ROOT /genie-biogem/data/input'	BIOGEM forcings (input) directory
sg_par_indir_name	'$RUNTIME_ROOT /genie-sedgem/data/input'	SEDGEM data input directory
sg_par_outdir_name	'$RUNTIME_OUTDIR /sedgem'	SEDGEM results output directory
rg_par_indir_name	'$RUNTIME_ROOT /genie-rokgem/data/input'	ROKEM data input directory
rg_par_outdir_name	'$RUNTIME_OUTDIR /rokgem'	ROKGEM results output directory

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
USEFUL(!) CLIMATE VARIABLES			
ma_genie_solar_constant	1368.0	W m-2	solar constant
ea_topo	'worbe2'	(STRING)	topography name1
ea_dosc	.true.	(LOGICAL)	seasonal insolation forcing?2
ea_diffa_scl	1.0	(REAL)	atmospheric diffusivity scaling factor
ea_diffa_len	0	(INTEGER)	grid point distance over which scalar is applied (j direction)
ea_36	'n'	('y'/'n')	use ATCHEM CO2 to calculate radioative forcing (else climate is invarient)?
ea_delf2x	5.77	W m-2	climate sensitivity; radiative forcing in W m-2 for a doubling of CO2 is calculated as: delf2x x ln(2.0)
go_topo 'worbe2'	(STRING)		topography filename1
go_dosc	.true.	(LOGICAL)	seasonal insolation forcing?2
go_ocnconv	0	(INTEGER)	ocean convection scheme3
gs_dosc	.true.	(LOGICAL)	seasonal insolation forcing?2

1 Note that an extension of ".k1" is added automatically. 2 The three climate components modules

must all include seasonal insolation forcing together or not (i.e., the 3 namelist prameter values must have the same value). 1 Current options are: 0 = original; 1 = Mueller.

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
GENERAL BIOGEOCHEMISTRY			
gm_par_carbconstset_name	"Mehrbach"	(STRING)	carbonate dissociation constants set
ATMOSPHERE BIOGEOCHEMISTRY			
ac_par_atm_wetlands_FCH4	0.0	mol yr^{-1}	Wetlands CH_4 flux
ac_par_atm_wetlands_FCH4_d13C	0.0	‰	Wetlands CH_4 $d^{13}C$

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: MISC CONTROL			
bg_ctrl_misc_Snorm	.true.	(LOGICAL)	tracer update with salinity normalization
bg_ctrl_misc_noSnorm	.false.	(LOGICAL)	tracer update without salinity normalization
bg_ctrl_misc_nobioupdate	.false.	(LOGICAL)	tracer update with no biological overprint
bg_ctrl_misc_brinerejection_bgc	.false.	(LOGICAL)	Include biogeochem in Sea-ice brine rejection?
bg_par_misc_brinerejection_frac	0.0	(LOGICAL)	Sea-ice brine rejection fraction
bg_par_misc_brinerejection_jmax	36	(LOGICAL	Max j for sea-ice brine rejection
OCEAN BIOGEOCHEMISTRY: BOUNDARY CONDITIONS			
bg_ctrl_force_sed_closedsystem	.true.	(LOGICAL)	Dissolution flux = rain flux to close system?
bg_ctrl_force_GOLDSTEInTS	.false.	(LOGICAL)	Allow temperature / salinity forcing of climate?
bg_ctrl_force_seaice	.false.	(LOGICAL)	Replace internal fractional sea-ice cover field?
bg_ctrl_force_windspeed	.true.	(LOGICAL)	Replace internal wind-speed field?
bg_ctrl_force_CaCO3toPOCrainratio	.false.	(LOGICAL)	Replace internal $CaCO_3$:POC export rain ratio?
bg_ctrl_force_POCdtoPOCrainratio	.false.	(LOGICAL)	Replace internal POCd:POC export rain ratio?
bg_ctrl_force_Cd_alpha	.false.	(LOGICAL)	Replace internal [Cd/P]POM/ [Cd/P]SW alpha?
bg_ctrl_force_scav_fpart_POC	.false.	(LOGICAL)	Replace internal POC flux for ^{230}Th and 231Pa isotope scavenging?
bg_ctrl_force_scav_fpart_CaCO3	.false.	(LOGICAL)	Replace internal $CaCO_3$ flux for ^{230}Th and ^{231}Pa isotope scavenging?
bg_ctrl_force_scav_fpart_opal	.false.	(LOGICAL)	Replace internal opal flux for ^{230}Th and ^{231}Pa isotope scavenging?
bg_ctrl_force_scav_fpart_det	.false.	(LOGICAL)	Replace internal det flux for ^{230}Th and ^{231}Pa isotope scavenging?
bg_ctrl_force_solconst	.false.	(LOGICAL)	Replace solar constant (with time-varying IP)?
bg_ctrl_force_oldformat	.false.	(LOGICAL)	Use old tracer forcing file format?
bg_par_seaice_file	'seaice.dat'	(STRING)	Filename for prescribed BIOGEM seaice boundary condition
bg_par_windspeed_file	'windspeed.dat'	(STRING)	Filename for prescribed BIOGEM windspeed (air-sea gas exchange) boundary condition
bg_par_CaCO3toPOCrainratio_file	'CaCO3toPOC' rainratio.dat'	(STRING)	Filename for prescribed BIOGEM $CaCO_3$:POC rain ratio boundary condition
bg_par_POCdtoPOCrainratio_file	'POCdtoPOC' rainratio.dat'	(STRING)	Filename for prescribed BIOGEM POCd:POC rain ratio boundary condition
bg_par_Cd_alpha_file 'Cd_alpha.dat'		(STRING)	Filename for prescribed Cd partition coefficient alpha field
bg_par_gastransfer_a	0.310	???	Value of Wanninkhof [1992] gas transfer coeff, a

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: MISC CONTROL continued ..			
bg_par_scav_fpart_POC_file	scav_fpart_POC.dat	(STRING)	
bg_par_scav_fpart_CaCO3_file	scav_fpart_CaCO3.dat	(STRING)	
bg_par_scav_fpart_opal_file	scav_fpart_opal.dat	(STRING)	
bg_par_scav_fpart_det_file	scav_fpart_det.dat	(STRING)	

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: BIOLOGICAL NEW PRODUCTION			
bg_par_bio_prodopt	'1N1T_PO4MM'	(STRING)	biological scheme ID
bg_par_bio_k0_PO4	2.0E-06	mol kg^{-1} yr^{-1}	maximum PO_4 consumption rate
bg_par_bio_k0_NO3	32.0E-06	mol kg^{-1} yr^{-1}	maximum NO3 consumption rate
bg_par_bio_c0_PO4	0.050E-06	mol kg^{-1}	[PO_4] M-M half-sat value
bg_par_bio_c0_NO3	3.200E-06	mol kg^{-1}	[NO3] M-M half-sat value
bg_par_bio_c0_N	1.600E-06	mol kg^{-1}	[NO3]+[NH_4] M-M half-sat value
bg_par_bio_c0_Fe	0.030E-09	mol kg^{-1}	[Fe] M-M half-sat value
bg_par_bio_c0_Fe_sp	0.125E-09	mol kg^{-1}	[Fe] M-M half-sat value for siliceous phytoplankton
bg_par_bio_c0_Fe_nsp	0.067E-09	mol kg^{-1}	[Fe] M-M half-sat value for non-siliceous phytoplankton
bg_par_bio_c0_SiO2	10.0E-06	mol kg^{-1}	[H_4SiO_4] M-M half-sat value
bg_par_bio_zc	75.0	m	Biological production zone depth (OCMIP-2)
bg_par_bio_tau	15	days	Biological production time-scale (OCMIP-2)
bg_par_bio_relprod_sp	0.952381	ratio	Fractional production of siliceous phytoplankton in Si/Fe-replete conditions. (20:1 for siliceous to non-siliceous phytoplanktion production (Ridgwell, 2001, PhD. Thesis)
bg_par_bio_I_eL	20.0	m	Light e-folding depth (OCMIP-2)
bg_par_bio_kT0	0.59		coefficient for temperature-dependent uptake rate modifier
bg_par_bio_kT_eT	15.8	K	e-folding temperature for T-dep. uptake rate modifier

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: ORGANIC MATTER UPTAKE (EXPORT) RATIOS			
bg_par_bio_red_POP_PON	16.0	n/a	N/P organic matter Redfield ratio
bg_par_bio_red_POP_POC	106.0	n/a	C/P organic matter Redfield ratio
bg_par_bio_red_POP_PO2	-138.0	n/a	O2/P organic matter pseudo-Redfield ratio
bg_par_bio_red_PON_ALK	-1.00	n/a	ALK/N alkalinty correction factor
bg_par_bio_red_DOMfrac	0.66	n/a	production fraction of dissolved organic matter
OCEAN BIOGEOCHEMISTRY: INORGANIC MATTER UPTAKE (EXPORT) RATIOS			
bg_par_bio_red_POC_CaCO3	0.2	(LOGICAL)	base $CaCO_3$:POC export ratio
bg_par_bio_red_POC_CaCO3_pP	0.0	(LOGICAL)	exponent for modifier of $CaCO_3$:POC export ratio
bg_par_bio_red_POC_opal	1.0	(LOGICAL)	base opal:POC export ratio

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: REMINERALIZATION			
bg_par_bio_remin_DOMlifetime	0.5	yrs	DOC lifetime
bg_par_bio_remin_CH4rate	1.0e-4	d^{-1}	Specific CH_4 oxidation rate
bg_ctrl_bio_remin_POC_fixed	.true.	(LOGICAL)	fixed-profile POM remineralization?
bg_ctrl_bio_remin_POC_ballast	.false.	(LOGICAL)	Ballasting parameterization?
bg_par_bio_remin_POC_frac2	0.05	n/a	initial fractional abundance of fraction #2
bg_par_bio_remin_POC_eL1	500.0	m	remineralization length: fraction #1
bg_par_bio_remin_POC_eL2	1000000.0	m	remineralization length: fraction #2
bg_ctrl_bio_remin_CaCO3_fixed	.true.	(LOGICAL)	fixed-profile $CaCO_3$ remineralization?
bg_par_bio_remin_CaCO3_frac2	0.5	n/a	initial fractional abundance of fraction #2
bg_par_bio_remin_CaCO3_eL1	1000.0	m	remineralization length: fraction #1
bg_par_bio_remin_CaCO3_eL2	1000000.0	m	remineralization length: fraction #2
bg_ctrl_bio_remin_opal_fixed	.false.	(LOGICAL)	fixed-profile opal remineralization?
bg_par_bio_remin_opal_frac2	0.5	n/a	initial fractional abundance of fraction #2
bg_par_bio_remin_opal_eL1	1000.0	m	remineralization length: fraction #1
bg_par_bio_remin_opal_eL2	1000000.0	m	remineralization length: fraction #2
bg_par_bio_remin_sinkingrate	125.0	m d^{-1}	prescribed particle sinking rate
bg_par_bio_remin_ballast_kc	0.130		Organic matter carrying capacity of $CaCO_3$
bg_par_bio_remin_ballast_ko	0.0		Organic matter carrying capacity of opal
bg_par_bio_remin_ballast_kl	0.0		Organic matter carrying capacity of lithogenics
bg_ctrl_bio_remin_ONtoNH4	.false.	(LOGICAL)	aerobic remineralization of ON; NH_4 (not NO3)
bg_par_bio_remin_denitrO2thresh	0.0	mol kg^{-1}	Denitrification [O2] threshold
bg_ctrl_bio_remin_reminfix	.false.	(LOGICAL)	Stop rapidly-oxidizing species going < 0.0?
OCEAN BIOGEOCHEMISTRY: ISOTOPIC FRACTIONATION			
bg_par_d13C_DIC_Corg_ef	25		Fractionation for intercellular C fixation (Ridgwell, 2001, PhD. Thesis)
bg_par_d13C_DIC_Corg_ef_sp	25		Fractionation for intercellular C fixation of siliceous phytoplanktion (Ridgwell, 2001, PhD. Thesis)
bg_par_d13C_DIC_Corg_ef_nsp	20		Fractionation for intercellular C fixation of non-siliceous phytoplanktion (Ridgwell, 2001, PhD. Thesis)
bg_ar_d30Si_opal_epsilon	-1.1	‰	Fractionation of ^{30} during opal formation by diatoms. Default value: -1.1 (De La Rocha et al., 1997)
bg_par_d114Cd_POCd_epsilon	-1.0		$d^{114}Cd = 1.0006$
bg_par_d7Li_LiCO3_epsilon	3.0		7/6Li fractionation between Li and LiCO
bg_opt_bio_foram_p_13C_delta	NONE	(STRING)	Planktic foram ^{13}C fractionation scheme ID string

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: IRON			
bg_par_det_Fe_sol	1.0	n/a	fractional aeolian Fe solubility
bg_par_det_Fe_sol_exp	1.0	n/a	exponent for aeolian Fe solubility1
bg_ctrl_bio_red_fixedFetoC	.false.	(LOGICAL)	fixed cellular Fe:C ratio?
bg_par_bio_red_POFe_POC	250000.0	n/a	C/Fe organic matter ratio
bg_ctrl_bio_Fe_fixedKscav	.false.	fixed scavening rate	(if not: Parekh scheme)?
bg_par_scav_Fe_Ks	0.1E-3	d^{-1}	fixed Fe scavenging rate
bg_par_scav_Fe_sf_POC	0.300	n/a	Parekh Fe scavenging rate scale factor: POC
bg_par_scav_Fe_sf_CaCO3	0.0	n/a	Parekh Fe scavenging rate scale factor: $CaCO_3$
bg_par_scav_Fe_sf_opal	0.0	n/a	Parekh Fe scavenging rate scale factor: opal
bg_par_scav_Fe_sf_det	0.0	n/a	Parekh Fe scavenging rate scale factor: det
bg_par_scav_fremin	1.0	n/a	Fraction of scavenged Fe remineralizable
bg_ctrl_bio_NO_fsedFe	.true.	(LOGICAL)	Prevent return of Fe from the sediments?
bg_par_K_FeL_pP	11.0		log10 of Fe ligand stability constant K'(FeL)
bg_par_bio_FetoC_pP	-0.4225		[FeT] dependent Fe:C ratio [Ridgwell, 2001] – power
bg_par_bio_FetoC_K	94500.0		[FeT] dependent Fe:C ratio [Ridgwell, 2001] – scaling
bg_par_bio_FetoC_C	0.0		[FeT] dependent Fe:C ratio [Ridgwell, 2001] – constant
OCEAN BIOGEOCHEMISTRY: SILICA			
OCEAN BIOGEOCHEMISTRY: NITROGEN			
bg_par_bio_mu1	1.0	yr^{-1} mu^{-1}	maximum rate of export production
bg_par_bio_mu2	0.2	yr^{-1} mu-2	maximum rate of export production from N_2-fixation
bg_par_bio_N2fixthresh	100.0E-06	mol yr^{-1}	Threshold NO3 + NH_4 to encourage N_2 fixation
bg_par_bio_Nstar_offset	2.90E-06	mol yr^{-1}	N-star calculation offset
OCEAN BIOGEOCHEMISTRY: TRACE METALS			
bg_par_bio_red_POC_POCd	0.0E-6	n/a	Default cellular C:Cd (Cd/C) ratio
bg_par_bio_red_POC_POCd_alpha	10.0	n/a	[Cd/P]POM/[Cd/P]SW partition coefficient (alpha)
bg_ctrl_bio_red_CdtoC_Felim	.true.	(LOGICAL)	Fe-limitation dependent Cd:C 'Redfield' uptake ratio?
bg_par_bio_red_CdtoC_Felim_min	3.000E-6	n/a	Minimum (Fe replete) Cd:C uptake ratio
bg_par_bio_red_CdtoC_Felim_max	6.000E-6	n/a	Maximum (Fe limited) Cd:C uptake ratio
bg_par_bio_red_CaCO3_LiCO3	0.0E-6		Default $CaCO_3$ Ca:Li ratio
bg_par_bio_red_CaCO3_LiCO3_alpha	1.0		partition coefficient (alpha)

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: ^{230}Th AND ^{231}Pa			
bg_par_scav_230Th_scavopt		(STRING)	Scavenging scheme ID string for ^{230}Th
bg_par_scav_231Pa_scavopt		(STRING)	Scavenging scheme ID string for ^{231}Pa
bg_par_scav_230Th_KPOC	1.e7		Equilibrium partition coefficient for POC associate ^{230}Th. Default value of 1e7 used by Siddall et al. (2005) in their control simulation.
bg_par_scav_230Th_KCaCO3	1.e7		Equilibrium partition coefficient for $CaCO_3$ associated ^{230}Th. Default value of 1e7 used by Siddall et al. (2005) in their control simulation.
bg_par_scav_230Th_Kopal	0.05e7		Equilibrium partition coefficient for opal associate ^{230}Th. Default value of 0.05e7 used by Siddall et a (2005)in their control simulation.
bg_par_scav_230Th_Kdet	0		Equilibrium partition coefficient for detrital associated ^{230}Th. Default value of 0 used by Sidda et al. (2005) in their control simulation.
bg_par_scav_231Pa_KPOC	1.e7		quilibrium partition coefficient for POC associated ^{231}Pa. Default value of 1e7 used by Siddall et al. (2005) in their control simulation.
bg_par_scav_231Pa_KCaCO3	0.025e7		Equilibrium partition coefficient for $CaCO_3$ associated ^{231}Pa. Default value of 0.025e7 used by Siddall et al. (2005) in their control simulation.
bg_par_scav_231Pa_Kopal	0.1667e7		Equilibrium partition coefficient for opal associated ^{231}Pa. Default value of 0.1667e7 used by Siddall et al. (2005)in their control simulation.
bg_par_scav_231Pa_Kdet	0		Equilibrium partition coefficient for detrital associated ^{231}Pa. Default value of 1e7 used by Siddall et al. (2005) in their control simulation.
bg_par_scav_230Th_indepsinkingvel	1000.0	m yr^{-1}	Independent scheme for sinking of particle associated ^{230}Th: non-zero velocity enables independent scheme and disables settling in accord with the settling of the scavenging particulate type. Default value of 1000.0 used by Siddall et al. (2005)in their control simulation.
bg_par_scav_231Pa_indepsinkingvel	1000.0	m yr^{-1}	Independent scheme for sinking of particle associated ^{231}Pa: non-zero velocity enables independent scheme and disbles settling in accord with the settling of the scavenging particulate type. Default value of 1000.0 used by Siddall et al. (2005)in their control simulation.

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: ABIOTIC PRECIPITATION			
bg_par_bio_CaCO3precip_sf	0.0		Scale factor for $CaCO_3$ precipitation
bg_par_bio_CaCO3precip_exp	0.0		Rate law power for $CaCO_3$ precipitation
bg_ctrl_bio_CaCO3precip	.false.	(LOGICAL)	Allow abiotic $CaCO_3$ precipitation?
bg_ctrl_bio_CaCO3precip_sur	.true.	(LOGICAL)	Restrict precipitation to surface layer?

1 Use a value of 1.0 for uniform solubility.

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: DATA SAVING: TIME-SLICES			
bg_ctrl_data_save_slice_ocnatm	.false.	(LOGICAL)	atmospheric (interface) composition (2D)'
bg_ctrl_data_save_slice_ocn	.true.	(LOGICAL)	ocean composition (3D)?
bg_ctrl_data_save_slice_ocnsed	.false.	(LOGICAL)	sediment (interface) composition (2D)?
bg_ctrl_data_save_slice_fairsea	.true.	(LOGICAL)	Air-sea gas exchange (2D)?
bg_ctrl_data_save_slice_focnatm	.false.	(LOGICAL)	ocean-atmosphere flux (2D)?
bg_ctrl_data_save_slice_focnsed	.false.	(LOGICAL)	ocean-sediment flux (2D)?
bg_ctrl_data_save_slice_fsedocn	.false.	(LOGICAL)	sediment-ocean flux (2D)?
bg_ctrl_data_save_slice_bio	.true.	(LOGICAL)	biological fluxes (3D)?
bg_ctrl_data_save_slice_carb	.true.	(LOGICAL)	aqueous carbonate system properties (3D
bg_ctrl_data_save_slice_carbconst	.false.	(LOGICAL)	aqueous carbonate system constants (3D)
bg_ctrl_data_save_slice_phys_atm	.false.	(LOGICAL)	atmospheric physical properties (2D)?
bg_ctrl_data_save_slice_phys_ocn	.false.	(LOGICAL)	ocean physical properties (3D)?
bg_ctrl_data_save_slice_misc	.true.	(LOGICAL)	miscellaneous properties (-)?
bg_ctrl_data_save_slice_diag	.false.	(LOGICAL)	biogeochemical diagnostics?
bg_par_data_save_slice_dt	1.0	yr	integration interval
bg_par_infile_slice_name	'biogem_save _timeslice.dat'	(STRING)	time-slice mid-point specification filename
OCEAN BIOGEOCHEMISTRY: DATA SAVING: TIME-SERIES			
bg_ctrl_data_save_sig_ocnatm	.true.	(LOGICAL)	atmospheric (interface) composition?
bg_ctrl_data_save_sig_ocn	.true.	(LOGICAL)	oceanic composition?
bg_ctrl_data_save_sig_fexport	.true.	(LOGICAL)	export flux?
bg_ctrl_data_save_sig_fairsea	.true.	(LOGICAL)	Air-sea gas exchange?
bg_ctrl_data_save_sig_ocnsed	.true.	(LOGICAL)	sediment (interface) composition?
bg_ctrl_data_save_sig_focnatm	.false.	(LOGICAL)	ocean-¿atmosphere flux?
bg_ctrl_data_save_sig_focnsed	.true.	(LOGICAL)	ocean-¿sediment flux?
bg_ctrl_data_save_sig_fsedocn	.true.	(LOGICAL)	sediment-¿ocean flux?
bg_ctrl_data_save_sig_ocnSS	.true.	(LOGICAL)	ocean surface tracers?
bg_ctrl_data_save_sig_carbSS	.true.	(LOGICAL)	ocean surface carbonate chemistry?
bg_ctrl_data_save_sig_misc	.true.	(LOGICAL)	miscellaneous properties?
bg_ctrl_data_save_sig_diag	.true.	(LOGICAL)	biogeochemical diagnostics?
bg_par_data_save_sig_dt	1.0	yr	integration interval
bg_par_infile_sig_name	'biogem_save_sig.dat'	(STRING)	time-slice mid-point specification filename
OCEAN BIOGEOCHEMISTRY: DATA SAVING: TIME-MISC			
bg_ctrl_data_save_derived	.false.	(LOGICAL)	save 'derived'1 data?
bg_ctrl_data_save_GLOBAL	.true.	(LOGICAL)	save global diagnostics2?
bg_ctrl_data_save_slice_ascii	.false.	(LOGICAL)	save time-slices in ASCII format?
bg_ctrl_data_save_sig_ascii	.true.	(LOGICAL)	save time-series in ASCII format?

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
OCEAN BIOGEOCHEMISTRY: TRACER AUDITING AND DEBUGGING OPTIONS			
bg_ctrl_audit	.true.	(LOGICAL)	audit tracer inventory?
bg_ctrl_audit_fatal	.false.	(LOGICAL)	halt on audit fail?
bg_par_misc_audit_relerr	1.0E-08	n/a	threshold of relative inventory change to trigger audit error
bg_ctrl_debug_reportwarnings	.false.	(LOGICAL)	report all run-time warnings?
bg_ctrl_debug_lvl1	.false.	(LOGICAL)	report level #1 debug?
bg_ctrl_debug_lvl2	.false.	(LOGICAL)	report level #2 debug?

1 e.g., salinity-normalized ocean tracers, tracer inventories of each cell. 2 Saved at time-slice intervals.

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
DEEP-SEA SEDIMENTS: RUN CONTROL			
sg_ctrl_continuing	.false.	(LOGICAL)	continuing sedgem?
sg_start_year	0.0		Simulation start year [REAL]
sg_par_misc_t_runtime	1000.0	yr	Simulation run length
DEEP-SEA SEDIMENTS: PHYSICAL CONFIGURATION			
sg_par_sed_top_th	1.0	cm	top ('well-mixed') sediment layer thickness
sg_par_sed_poros_det	0.880	cm3 cm-3	detrital porosity
sg_par_sed_poros_CaCO3	0.610	cm3 cm-3	carbonate porosity in top layer
DEEP-SEA SEDIMENTS: DIAGENESIS SCHEME: SELECTION			
sg_par_sed_diagen_CaCO3opt	'archer1991explicit'	(STRING)	$CaCO_3$ diagenesis scheme
sg_par_sed_diagen_opalopt	'none'	(STRING)	opal diagenesis scheme
sg_par_sed_diagen_Corgopt 7	'none'	(STRING)	organic matter diagenesis scheme
DEEP-SEA SEDIMENTS: DIAGENESIS SCHEME: CONTROl			
sg_ctrl_sed_bioturb	.true.	(LOGICAL)	bioturbate sediment stack?
sg_ctrl_sed_bioturb_Archer	.true.	(LOGICAL)	use Archer et al. [2002] bioturbation scheme?
sg_par_n_sed_mix	20	n/a	maximum layer depth for bioturbation
sg_par_sed_mix_k_sur_max	0.15	cm2 yr^{-1}	maximum surface bioturbation mixing rate
sg_par_sed_mix_k_sur_min	0.15	cm2 yr^{-1}	minimum surface bioturbation mixing rate
sg_par_sed_fdet	0.150	g cm-2 kyr^{-1}	prescribed (additional) flux of detrital material to the seds
sg_par_sed_diagen_fPOCfrac	1.0	n/a	fraction of POC rain available for drivi $CaCO_3$ dissolution
DEEP-SEA SEDIMENTS: DIAGENEIS SCHEME: ARCHER 1991			
sg_par_sed_archer1991_dissc	1.1574e-5	-s	dissolution rate constant
sg_par_sed_archer1991_dissn	4.5	n/a	dissolution rate order
sg_par_sed_archer1991_rc	2.E-9	-s	organic degradation rate constant
sg_par_sed_archer1991_iterationmax	20		loop limit in 'o2org' subroutine
DEEP-SEA SEDIMENTS: MISC CONTROLS			
sg_par_sed_CaCO3precip_sf	0.0		$CaCO_3$ precipitation scale factor (abiot
sg_par_sed_CaCO3precip_exp	2.0		$CaCO_3$ precipitation rate law lower (abiotic)
sg_par_sed_reef_CaCO3precip_sf	0.0		$CaCO_3$ precipitation scale factor (coral
sg_par_sed_reef_CaCO3precip_exp	1.0		$CaCO_3$ precipitation rate law power (corals)
sg_par_sed_reef_calcite	.true.	(LOGICAL)	$CaCO_3$ precipitation as calcite (otherw aragonite)?
sg_par_sed_CaCO3_abioticohm_min	10.0		Min threshold for abiotic $CaCO_3$ precipitation
sg_par_sed_CaCO3_coralohm_max	10.0		Max threshold for coral $CaCO_3$ precipitation
sg_par_sed_poros_CaCO3_reef	0.5	cm3 cm-3	Reef $CaCO_3$ porosity
DEEP-SEA SEDIMENTS: DEEP-SEA SEDIMENTS: ISOTOPIC FRACTIONATION			
sg_opt_sed_foram_b_13C_delta	NONE	(STRING)	Benthic foram ^{13}C fractionation scheme ID string

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
DEEP-SEA SEDIMENTS: DEEP-SEA SEDIMENTS: HYDROTHERMAL AND OCEAN CRUSTAL WEATHERI			
sg_par_sed_hydroip_fLi	0.0	mol -yr	hydrothermal Li flux
sg_par_sed_hydroip_fLi_d7Li	4.0	‰	hydrothermal Li flux d^{7}Li
sg_par_sed_lowTalt_fLi_alpha	0.0	mol -yr	Li low temperature alteration sink (Li/Ca normal
sg_par_sed_lowTalt_7Li_epsilon	-15.0	‰	Li low temperature alteration sink ^{7}Li epsilon
sg_par_sed_clay_fLi_alpha	0.0	mol -yr	Li clay formation sink (Li/Ca normalized)
sg_par_sed_clay_7Li_epsilon	-15.0	‰	Li clay formation sink ^{7}Li epsilon
DEEP-SEA SEDIMENTS: DEEP-SEA SEDIMENTS: MISC CONTROLS			
sg_ctrl_sed_forcedohmega_ca	.true.	(LOGICAL)	Ca-only adjustment for forced ocean saturation?
sg_par_sed_ohmegamin	0.00	n/a	forced minimum saturation (calcite omega) anywh
sg_par_sed_ohmegamin_flux	0.00	mol Ca cm-2	per time-step imposed sed-¿ocn flux for saturation
DEEP-SEA SEDIMENTS: DEEP-SEA SEDIMENTS: DATA FILENAMES			
sg_par_sed_topo_D	'sedgem_topo_D.36x36'	(STRING)	sediment water depth grid name
sg_par_sedcore_save_mask_name	'sedgem_save_mask.36x36'	(STRING)	sediment core save mask name
sg_par_sed_mix_k_name	''sedgem_sed_mix_k.dat'	(STRING)	biodiffusion profile name
DEEP-SEA SEDIMENTS: DEEP-SEA SEDIMENTS: I/O: MISC			
sg_ctrl_data_save_ascii	.false.	(LOGICAL)	save 2-D data fields in ASCII format?
sg_ctrl_data_save_wtfrac	.true.	(LOGICAL)	report sediment data as a mass fraction?
sg_ctrl_misc_debug1	.false.	(LOGICAL)	debug level #1?
sg_ctrl_misc_debug2	.false.	(LOGICAL)	debug level #2?
sg_ctrl_misc_debug3	.false.	(LOGICAL)	debug level #3?
sg_ctrl_misc_debug4	.false.	(LOGICAL)	debug level #4?
sg_ctrl_misc_report_err	.false.	(LOGICAL)	report errors?
sg_par_misc_debug_i	1	n/a	i sediment coordinate for debug reporting
sg_par_misc_debug_j	1	n/a	j sediment coordinate for debug reporting

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
TERRESTRIAL WEATHERING: RIVER ROUTING PARAMETERS			
rg_topo	'worbe2.k1'	n/a	continental config and river routing filename
TERRESTRIAL WEATHERING: WEATHERING SCHEME PARAMETER			
rg_par_weathopt	'Global_avg'	(STRING)	weathering option
rg_opt_weather_T_Ca	.false.	(LOGICAL)	$CaCO_3$ weathering - temperature feedback
rg_opt_weather_T_Si	.false.	(LOGICAL)	CaSiO3 weathering - temperature feedback
rg_opt_weather_R_explicit	.true.	(LOGICAL)	if true then R/R_0 is used rather tha the 1 + 0.045(T-T_0) parameterisation from GEOCARB
rg_opt_weather_R_Ca	.false.	(LOGICAL)	$CaCO_3$ weathering - runoff feedback
rg_opt_weather_R_Si	.false.	(LOGICAL)	CaSiO3 weathering - runoff feedback
rg_opt_weather_P_explicit	.false.	(LOGICAL)	if true then P/P_0 is used rather tha the [2RCO2/(1+RCO2)]$\hat{0}$.4 parameterisation from GEOCARB
rg_opt_weather_P_Ca	.false.	(LOGICAL)	$CaCO_3$ weathering - productivity feedback
rg_opt_weather_P_Si	.false.	(LOGICAL)	CaSiO3 weathering - productivity feedback
rg_par_prodopt	'GPP'	(STRING)	prodictivity to use ('GPP' or 'NPP')
rg_par_weather_T0	8.4777	deg C	eathering reference mean global land surface temperature
rg_par_weather_R0	5.619E-06	mm -s	weathering reference mean global runoff
rg_par_weather_P0	1.2585	kg C m-2 yr^{-1}	weathering reference mean global land productivity
rg_par_weather_CO20	278	ppm	weathering reference mean atmosphe CO2 level
rg_par_outgas_CO2	0.0	mol C yr^{-1}	outgassing rate [5.00E12]
rg_par_outgas_CO2_13C	-5.000	‰	mean volcanic/metamorphic $d^{13}C$
TERRESTRIAL WEATHERING: GLOBAL AVERAGE WEATHERING PARAMETERS			
rg_opt_weather_CaCO3	.FALSE.	(LOGICAL)	$CaCO_3$_weathering-temperature feedback?
rg_opt_weather_CaSiO3	.FALSE.	(LOGICAL)	CaSiO3_weathering-temperature feedback?
rg_opt_weather_P	.FALSE.	(LOGICAL)	productivity-weathering feedback
rg_par_weather_T0	8.451890	C	weathering reference mean global lan surface temperature
rg_par_weather_P0	0.716	kgC m-2 yr^{-1}	weathering reference mean global land productivity
rg_par_outgas_CO2	0.0	mol C yr^{-1}	CO2 outgassing rate
rg_par_outgas_CO2_13C	-5.000	‰	mean volcanic/metamorphic $d^{13}C$
rg_par_weather_CaSiO3	0.0	mol Ca2+ yr^{-1}	global silicate weathering rate
rg_par_weather_CaCO3	10.00E+12	mol Ca2+ yr^{-1}	global carbonate weathering rate
rg_par_weather_CaCO3_13C	0.000	‰	mean carbonate $d^{13}C$
rg_par_weather_CaSiO3_fracLi	10.00E-6		global silicate Li abundance
rg_par_weather_CaSiO3_Li_d7Li	4.000	‰	global silicate $d^{7}Li$
rg_par_weather_CaSiO3_Li_7Li_epsilon	15.000	‰	clay fractionation at normalized weathering
rg_par_weather_CaSiO3_Li_7Li_epsilon_max	1'5.000	‰	maximum clay fractionation

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
TERRESTRIAL WEATHERING: 2-D WEATHERING PARAMETERS			
rg_par_lith_data	GEM_CO2	(STRING)	name of lithological data set - corresponding to directory genie-rokgem/ data/input/lithologies_rg_lith_data_ 036_036
rg_truncate_to_land	.true.	(LOGICAL)	truncate lithological maps to genie land-mask -if option is set to false than flux from land in genie ocean, goes direct to ocean
rg_calibrate_weath	.false.	(LOGICAL)	calibrate 2D weathering - if .true. use values below
rg_calibrate_weather_GKWM_CaCO3	1.583		calibratation value for 2D $CaCO_3$ weathering for GKWM scheme -to avoid drift, set equal to (half of $CaCO_3$ sediment burrial flux)/ (original uncorrected flux) (e.g. 1.583 for spun-up model)
rg_calibrate_weather_GEM_CO2_CaCO3	1.178		calibratation value for 2D $CaCO_3$ weathering for GEM-CO2 scheme - to avoid drift, set equal to (half of $CaCO_3$ sediment burrial flux)/(original uncorrected flux) (e.g. 1.178 for spun-up model)
rg_calibrate_weather_GKWM_CaSiO3	0.8548		c alibration value for 2D CaSiO3 weathering for GKWM scheme - to avoid drift, set equal to (half of $CaCO_3$ sediment burrial flux)/ (original uncorrected flux) (e.g. 0.8548 for spun-up model)
rg_calibrate_weather_GEM_CO2_CaSiO3	0.8878		calibration value for 2D CaSiO3 weathering for GEM-CO2 scheme - to avoid drift, set equal to (half of $CaCO_3$ sediment burrial flux)/(original uncorrected flux) (e.g. 0.8878 for spun-up model)
rg_calibrate_runoff	.false.	(LOGICAL)	calibrate runoff in 2D weathering functions to values in papers

NAME	DEFAULT VALUE	UNITS	DESCRIPTION
TERRESTRIAL WEATHERING: DATA FILENAMES			
rg_par_output_years_file	'rokgem_output_years.dat'	(STRING)	filename of file containing the times (in years) at which output is to be generated