

Programmsteuerdatei für WaSim-ETH, welche alle Modellparameter, Dateinamen und Kontrollparameter enthält, die zur Modellierung des Gebietswasserhaushaltes für das Einzugsgebiet des Cunewalder Wassers notwendig sind.

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$set $year      = 2010
#
# comment lines are indicated by an "#". They are allowed after the entries or at the beginning of the lines
#
# paragraphs of the control file:
#
# [output_list]
# [output_interval]
# [coordinates]      (geogr. coordinates)
# [region_transition_distance] for multiple regression regions
# [elevation_model]  (name of the elevation model)
# [zonengrid]        (name of the zone grid)
# [standardgrids]    (name of other static grids like slope angle, slope aspect, topogr. factor)
# [variable_grids]   (names of albedo and soil storage - used by more than one modules)
# [model_time]       (start end end-dates of model time)
# [meteo_data_count] (number of mete data to interpolate)
# [meteo_names]      (names of meteo data to interpolate - each name is later the headline of a paragraph for interpolation)
# [precipitation_correction] (paragraph for parameters of the prec.-correction)
# [radiation_correction] (paragraph with parameters for radiation correction)
# [evapotranspiration] (paragraph with parameters for evapotranspiration)
# [snow_model]       (paragraph with parameters for the snow model)
# [ice_firn]         (paragraph with parameters for the glacier model)
# [interzeption_model] (paragraph with parameters for the interzeption modell)
# [infiltration_model] (paragraph with parameters for the infiltration modell)
# [soil_model]       (paragraph with parameters for the soilmodel)
# [SiltingUpModel]   (paragraph with parameters for the silting up model)
# [unsatzon_model]   (paragraph with parameters for the unsaturated zone model)
# [SurfaceRoutingModel] (paragraph with parameters for the surface routing model)
# [irrigation]       (paragraph with parameters for irrigation model)
# [groundwater_flow] (paragraph with parameters for groundwater model)
# [ExternalCoupling] (paragraph with parameters for external coupling)
# [routing_model]    (paragraph with Parametern for discharge routing)
# [landuse_table]    (paragraph with land use (vegetation) parameters)
# [soil_table]       (paragraph with soil properties)
# [substance_transport] (paragraph with tracer properties)
# [abstraction_rule_reservoir_n] rules for routing submodel, each reservoir has its own rule
# [multilayer_landuse] new multilayer landuse table definition
#
# symbol definitions begin with the set command:
# max. 200 symbols can be defined

$set $outpath      = c:\wasim\hwrmrp_model\output\
$set $inpath       = c:\wasim\hwrmrp_model\input\
$set $inpath_meteo = c:\wasim\hwrmrp_model\input\meteo\
$set $exchnpath    = c:\wasim\hwrmrp_model\exchange\
$set $InitialStateDirectory = c:\wasim\hwrmrp_model\output\State\In\
$set $DefaultOutputDirectory = c:\wasim\hwrmrp_model\output\Default\

$set $time = 60
$set $starthour = 1
$set $startday = 1
$set $startmonth = 8
$set $startyear = 2010
$set $endhour = 24
$set $endday = 15
$set $endmonth = 8
$set $endyear = 2010

$set $grid      = cun20
$set $stack     = cun20
$set $suffix    = grd
$set $code      = s

# variables for standardgrids
# first section: grids, which differ for different subdivisions of the basin
$set $zone_grid      = $grid//.ezg
$set $subcatchments  = $grid//.ezg
$set $flow_time_grid = $grid//.fzs
$set $river_links_grid = $grid//.lnk
$set $regio_grid     = $grid//.reg

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#second section: grids, which doesn't depend on subdivision (only pixel-values are of interest)

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$set $elevation_model = $grid//.dhm
$set $RelCellArea_grid = $grid//.rca
$set $CellSizeX_grid = $grid//.csx
$set $CellSizeY_grid = $grid//.csy
$set $slope_grid = $grid//.slp
$set $FlowDirection_grid = $grid//.fld
$set $aspect_grid = $grid//.exp
$set $land_use_grid = $grid//.use
$set $ice_firn_grid = $grid//.ice
$set $field_capacity_grid = $grid//.nfk
$set $ATBgrid = $grid//.atb
$set $hydr_cond_grid = $grid//.k
$set $soil_types = $grid//.art
$set $sky_view_factor_grid = $grid//.hor
$set $drain_depth_grid = $grid//.drn
$set $drain_distance_grid = $grid//.dis
$set $irrigationcodes = $grid//.irr
$set $max_pond_grid = $grid//.maxpond
$set $clay_depth_grid = $grid//.cly
$set $river_depth_grid = $grid//.dep
$set $river_width_grid = $grid//.wit
$set $tracer_1 = $grid//.c1
$set $tracer_2 = $grid//.c2
$set $tracer_3 = $grid//.c3
$set $tracer_4 = $grid//.c4
$set $tracer_5 = $grid//.c5
$set $tracer_6 = $grid//.c6
$set $tracer_7 = $grid//.c7
$set $tracer_8 = $grid//.c8
$set $tracer_9 = $grid//.c9
$set $kolmationsgrid = $grid//.kol
$set $gw_kx_1_grid = $grid//.kx1
$set $gw_kx_2_grid = $grid//.kx2
$set $gw_kx_3_grid = $grid//.kx3
$set $gw_ky_1_grid = $grid//.ky1
$set $gw_ky_2_grid = $grid//.ky2
$set $gw_ky_3_grid = $grid//.ky3
$set $gw_bound_h_1_grid = $grid//.bh1
$set $gw_bound_h_2_grid = $grid//.bh2
$set $gw_bound_h_3_grid = $grid//.bh3
$set $gw_bound_q_1_grid = $grid//.bq1
$set $gw_bound_q_2_grid = $grid//.bq2
$set $gw_bound_q_3_grid = $grid//.bq3
$set $aquiferthick1 = $grid//.aq1
$set $aquiferthick2 = $grid//.aq2
$set $aquiferthick3 = $grid//.aq3
$set $gw_storage_coeff_1 = $grid//.s01
$set $gw_storage_coeff_2 = $grid//.s02
$set $gw_storage_coeff_3 = $grid//.s03
$set $gw_kolmation_1 = $grid//.gk1
$set $gw_kolmation_2 = $grid//.gk2
$set $gw_kolmation_3 = $grid//.gk3
$set $lake_grid = $grid//.lak
$set $taucrit_grid = $grid//.tau
$set $ThawCoeffPermaFrost = $grid//.alpha

# grids for surface hydrology modules
$set $forcingunitsgrid1 = forc1//$grid//.$suffix
$set $TStartPhenoGrid1 = phen1//$grid//.$suffix
$set $chillingunitsgrid1 = chill1//$grid//.$suffix
$set $FStargrid1 = fstar1//$grid//.$suffix
$set $forcingunitsgrid2 = forc2//$grid//.$suffix
$set $TStartPhenoGrid2 = phen2//$grid//.$suffix
$set $chillingunitsgrid2 = chill2//$grid//.$suffix
$set $FStargrid2 = fstar2//$grid//.$suffix
$set $forcingunitsgrid3 = forc3//$grid//.$suffix
$set $TStartPhenoGrid3 = phen3//$grid//.$suffix
$set $chillingunitsgrid3 = chill3//$grid//.$suffix
$set $FStargrid3 = fstar3//$grid//.$suffix
$set $albedo = albe//$grid//.$suffix
$set $soilstoragegrid = sb_//$grid//.$suffix
$set $throughfall = qi_//$grid//.$suffix
$set $snowcover_outflow = qsno//$grid//.$suffix
$set $melt_from_snowcover = qsme//$grid//.$suffix
$set $days_snow = sday//$grid//.$suffix

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$set $snow_age      = sage//$grid//.$suffix
$set $snow_rate    = snow//$grid//.$suffix
$set $rain_rate    = rain//$grid//.$suffix
$set $firn_melt    = qfir//$grid//.$suffix
$set $ice_melt     = qice//$grid//.$suffix
$set $preci_grid   = prec//$grid//.$suffix
$set $preci_grid1  = prec1//$grid//.$suffix
$set $preci_idw_grid = prec//$grid//.$suffix
$set $irrig_grid   = irri//$grid//.$suffix
$set $etr2etpgrid  = er2ep//$grid//.$suffix
$set $stempegrid   = temp//$grid//.$suffix
$set $stempegrid1  = temp1//$grid//.$suffix
$set $stempegrid2  = temp2//$grid//.$suffix
$set $windgrid     = wind//$grid//.$suffix
$set $sunshinegrid = ssd_//$grid//.$suffix
$set $radiationgrid = rad_//$grid//.$suffix
$set $humiditygrid = humi//$grid//.$suffix
$set $vaporgrid    = vapo//$grid//.$suffix
$set $ETPgrid      = etp_//$grid//.$suffix
$set $EIPgrid      = eip_//$grid//.$suffix
$set $ETRgrid      = etr_//$grid//.$suffix
$set $EVAPgrid     = evap//$grid//.$suffix
$set $EVARgrid     = evar//$grid//.$suffix
$set $ETRSgrid     = etrs//$grid//.$suffix
$set $SSNOgrid     = ssno//$grid//.$suffix
$set $SLIQgrid     = sliq//$grid//.$suffix
$set $SSTOgrid     = ssto//$grid//.$suffix
$set $ssat_def_grid = sd_//$grid//.$suffix
$set $SUZgrid      = suz_//$grid//.$suffix
$set $SIFgrid      = sif_//$grid//.$suffix
$set $EIgrid       = ei_//$grid//.$suffix
$set $SIgrid       = si_//$grid//.$suffix
$set $ExpoCorrgrid = exco//$grid//.$suffix
$set $Tcorrgrid    = tcor//$grid//.$suffix
$set $Shapegrid    = shap//$grid//.$suffix
$set $INFEXgrid    = infx//$grid//.$suffix
$set $SATTgrid     = satt//$grid//.$suffix
$set $Nagrid       = na_//$grid//.$suffix
$set $SSPgrid      = ssp_//$grid//.$suffix
$set $Peakgrid     = peak//$grid//.$suffix
$set $SBIagrid     = sbia//$grid//.$suffix
$set $fcia_grid    = nfki//$grid//.$suffix
$set $tavg_grid    = tavg//$grid//.$suffix

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# now variables for unsaturated zone model
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$set $SB_1_grid    = sb05//$grid//.$suffix
$set $SB_2_grid    = sb1_//$grid//.$suffix
$set $ROOTgrid     = wurz//$grid//.$suffix
$set $QDgrid       = qd_//$grid//.$suffix
$set $QIgrid       = qif//$grid//.$suffix
$set $GWdepthgrid  = gwst//$grid//.$suffix
$set $GWthetagrid  = gwth//$grid//.$suffix
$set $GWNgrid      = gwn_//$grid//.$suffix
$set $UPRISEgrid   = uprs//$grid//.$suffix
$set $PERCOLgrid   = perc//$grid//.$suffix
$set $GWLEVELgrid  = gwlv//$grid//.$suffix
$set $QDRAINgrid   = qdrm//$grid//.$suffix
$set $QBgrid       = qb_//$grid//.$suffix
$set $GWINgrid     = gwin//$grid//.$suffix
$set $GWEXgrid     = gwex//$grid//.$suffix
$set $act_pond_grid = pond//$grid//.$suffix
$set $MACROINFgrid = macr//$grid//.$suffix
$set $SUBSTEPSgrid = step//$grid//.$suffix

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$set $SnowFreeDaysGrid = sfre//$grid//.$suffix
$set $SnowCoverDaysGrid = scov//$grid//.$suffix
$set $ThawDepthGrid    = thdp//$grid//.$suffix

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# variables for groundwater modeling
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$set $flowx1grid    = gwx1//$grid//.$suffix
$set $flowx2grid    = gwx2//$grid//.$suffix
$set $flowx3grid    = gwx3//$grid//.$suffix
$set $flowy1grid    = gwy1//$grid//.$suffix
$set $flowy2grid    = gwy2//$grid//.$suffix
$set $flowy3grid    = gwy3//$grid//.$suffix
$set $head1grid     = gwh1//$grid//.$suffix

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$set $head2grid = gwh2//$grid//.$suffix
$set $head3grid = gwh3//$grid//.$suffix
$set $GWbalance1grid = gwbalance1//$grid//.$suffix
$set $GWbalance2grid = gwbalance2//$grid//.$suffix
$set $GWbalance3grid = gwbalance3//$grid//.$suffix

# result grids for surface routing model
$set $surfspeed_grid = sfcv//$grid//.$suffix
$set $surfflux_grid = sflx//$grid//.$suffix

# some new stacks and grids for the dynamic glacier model
$set $firn_WE_stack = glfirn//$stack//.$suffix
$set $GlacierMassBalance = glmb//grid//.$suffix
$set $OldGlacierMassBalance = glmb_old//grid//.$suffix
$set $glacierizedCells_grid = glac//$grid//.$suffix
$set $glacier_codes_grid = gid_//$grid//.$suffix

# result-stacks for Unsatzonmodel
$set $Thetastack = teth//$stack//.$suffix
$set $hydraulic_heads_stack = hhyd//$stack//.$suffix
$set $geodetic_altitude_stack = hgeo//$stack//.$suffix
$set $flowstack = qu_//$stack//.$suffix
$set $conccstack = conc//$stack//.$suffix

# parameters for interpolation of meteorological input data
$set $SzenUse = 0
$set $IDWmaxdist = 100000
$set $IDWweight = 2
$set $Anisoslope = 35.0
$set $Anisotropie = 0.9

# explanation of writegrid and outputcode some lines below
$set $Writegrid = 3
$set $Writestack = 3
$set $once_per_interval = 2001
$set $avrg_per_24lnvs = 2024
$set $sum_per_24lnvs = 4024
$set $routing_code = 5001

# readgrids : 1 = read storage grids (as SI, SSNOW,SLIQ,SD,SUZ..) from hard disk, 0=generate and initialize with 0
$set $readgrids = 0
# read grids for dynamic phenology -> usually chilling grid should be read in if available because otherwise thermal time method will be
applied and not the sequential model
$set $DPreadgrids = 0

# Writegrid : max. 4 digits (nnnn)
#
# only if writegrid >= 1000: 1. digit (1nnn, or 2nnn)
# 0 = no vegetation period based grid is written
# 1 = sum grid is written for vegetation period (summing up each value as long as this cells vegetation period is active)
# 2 = average value grid is written for vegetation period (summing up each value as long as this cells vegetation period is active)
# only if writegrid >= 100: 2. digit (n1nn, or n2nn or n3nn or 1nn..3nn -> leading digits may be omitted)
# 0 = no minimum or maximum grid is written
# 1 = minimum grid is written (minimum value for each of the grid cells over the entire model period)
# 2 = maximum grid is written (maximum value for each of the grid cells over the entire model period)
# 3 = both grids are written (minimum and maximum value for each of the grid cells over the entire model period)
# only if Writegrid >= 10: 3rd digit: sums or means (1n ... 8n or n1n..n8n or nn1n..nn8n -> leading digits may be omitted)
# 0 = no sum grid will be written
# 1 = one sum grid will be written at the end of the model run
# 2 = one sum grid per model year
# 3 = one sum grid per model month
# 4 = one sum grid per day (only, if timestep < 1 day)
# 5 = one mean value grid at the end of the model run
# 6 = one mean value grid per model year
# 7 = one mean value grid per month
# 8 = one mean value grid per day
# last digit (nnn1 .. nnn5 or nn1..nn5 or n1..n5 or 1..5 -> leading digits may be omitted) (for actual values, not for Sums or means)
# 1 = (over)write each timestep into the same grid (for security in case of model crashes)
# 2 = write grids each timestep to new files, the name is build from the first 4 letters
# of the regular grid name and then from the number of month, day and hour (hoer as file extension).
# example: temprm500.grd will become prec0114.07 for 14.January, 7:00.
# 3 = only the last grid of the model run will be stored
# 4 = the grid from the last hour of each day (24:00) will be stored (for each day the same file will be overwritten)
# 5 = like 4, but each day a new grid file is created (like for code 2)
# 6 = actual grid at the end of each month
# 7 = actual grid at the end of each year

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#
# outputcode (for statistic files for zones or subcatchments)

# the Codes behind the names of the statistic files have the meaning of:
# <1000 : no output
# 1<nnn> : spatial mean values for the entire basin, averaged in time over <nnn> intervals (timesteps)
# 2<nnn> : spatial mean values for all zones (subbasin) and for the entire basin, averaged in time over <nnn> intervals (timesteps)
# 3<nnn> : spatial means for the entire basin, added up in time over <nnn> intervals (timesteps)
# 4<nnn> : spatial means for all zones (subbasin) and for the entire basin, added up in time over <nnn> intervals (timesteps)
# 5<nnn> : spatial means for the entire basin and for those subbasins which are specified in the output-list, averaged in time over
<nnn> intervals
# 6<nnn> : spatial means for the entire basin and for those subbasins which are specified in the output-list, added up in time over
<nnn> intervals
#
# example:
# 2001 = per timestep for all subcatchments (and for the entire basin) one (spatially averaged) value,
# 2004 = each 4 time steps one averaged value over the last 4 time steps for all subcatchments and for the entire basin,
# 4024 = Sums of the mean subcatchment/entire basin values of the timesteps over 24 timesteps (e.g. daily rain sums for
subcatchments),
# 3120 = averaged values (over 120 time steps!) only for the entire basin (spatially averaged)
# 5012 = averaged values (over 12 timesteps) as spatial averages for the entire basin and for each of the subbasins specified in the
output-list

[output_interval]
25      # increment of time steps until an output to the screen is done (24 = each day one output, if time steo = 1h)
1       # warning level for interpolation (no station within search radius)
0       # unit of routed discharge (0=mm/timestep, 1=m3/s)
0       # minutes from the hour-entry in the input data files until the end
# of the time step is reached 0 if the end of time step is given like "84 01 01 01",
# but it should be $time if the begin is given like in "84 01 01 00"
WriteAsciiGrids = 1          # 0 if grids should be written in WaSiM native format, 1 if in ESRI ASCII
format
InitialStateDirectory = $InitialStateDirectory          # if using this parameter, all state grids as well as the storage_richards.ftz
file will be expected in that directory for reading
DefaultOutputDirectory = $DefaultOutputDirectory      # this is the default output directory, all output is written to unless the given
filename contains an absolute path (starting with either / or ~ for UNIX or a drive letter and \ for Windows)
# there are some exceptions, though: for external coupling no default output path is used
# relative pathnames may be used as well.
# for compatibility reasons with older control files and WaSiM versions, both directories will only be used if the given filename has no
absolute path,
# so in order to use the new features, all $output uses should be reviewed and removed if necessary (or the variable should be set to
an empty string)

[coordinates]
52      # geogr. latitude (center of the basin -> for radiation calculations)
10      # geogr. longitude (center of the basin)
15.0    # meridian according to the official time (middle europe: 15)(east: 0 ... +180 degree, west: 0 ... -180 (or 360 ... 180)
1       # time shift of Meteo-data-time with respect to the true local time (mean sun time)
# e.g.: if meteo-data are stored in UTC-time and the time meridian is 15 east (central europe),
# than the local time is 1 hour later than the time in the meteo-data-file, so 1 hour has to be added to the time from this file
# this is important for calculation of sunshine duration and radiation

[region_transition_distance]
1000 # in m

[soil_surface_groundwater_substeps].
1     # number of sub time steps for the module group surface routing, unsaturated zone model and groundwater model
(and accumulation of real evapotranspiration)
# Values to start with are 1 (default), 2 (half of the common time step), 3 etc.
# Please be carefull to set too high values here since the model performance will go down dramatically, since unsatzenmodel and
surface routing are called each time!

[elevation_model]
$inpath/$elevation_model # grid with the digital elevation data

[zone_grid]
$inpath/$zone_grid      # grid with Zone codes

[standard_grids]
19      # number of standard grids
# path      # identification      # fillcode 0=no, 1=yes (fill missing values with values of nearest neighbor)
$inpath/$land_use_grid  landuse      1 # grid with land use data
$inpath/$slope_grid    slope_angle  1 # grid with slope angle data
$inpath/$aspect_grid   slope_aspect 1 # grid with slope aspect data
$inpath/$subcatchments zonegrid_soilmodel 1 # zone grid for the runoff generation model (and unstaured zone model)
$inpath/$soil_types    soil_types   1 # soil types as codes for the soil table

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$inpath//flow_time_grid    flow_times          1 # grid with flow times for surface runoff to the subbasin outlet
$inpath//aquiferthick1    aquifer_thickness_1    0 # grid with thickness of first aquifer (m from soil surface to the aquifer bottom)
$inpath//gw_storage_coeff_1 gw_storage_coeff_1      1 # storage coefficients for 1. aquifer
$inpath//gw_bound_h_1_grid gw_boundary_fix_h_1    0 # periodicity = 1 D 12 persistent = 0 # boundary conditions 1 constant head for layer 1
$inpath//gw_bound_q_1_grid gw_boundary_fix_q_1    0 # boundary conditions 2 (given flux perpendicular to the border) for layer 1
$inpath//gw_kx_1_grid     gw_k_x_1              1 # lateral hydraulic conductivities for the 1. aquifer in x direction
$inpath//gw_ky_1_grid     gw_k_y_1              1 # lateral hydraulic conductivities for the 1. aquifer in y direction
$inpath//gw_kolmation_1   gw_kolmation_1        1 # kolmation (leakage factor) between 1st and 2nd aquifer
$inpath//$grid//.etp0     pot_transpiration0     fillcode = 1 #defaultValue = 0 writecode = 8 readcode = 0
$inpath//$grid//.etr0     real_transpiration0    fillcode = 1 #defaultValue = 0 writecode = 8 readcode = 0
$inpath//$grid//.etp1     pot_transpiration1     fillcode = 1 #defaultValue = 0 writecode = 8 readcode = 0
$inpath//$grid//.etr1     real_transpiration1    fillcode = 1 #defaultValue = 0 writecode = 8 readcode = 0
$inpath//$grid//.etp      potential_evaporation   fillcode = 1 #defaultValue = 0 writecode = 8 readcode = 0
$inpath//$grid//.etr      real_evaporation       fillcode = 1 #defaultValue = 0 writecode = 8 readcode = 0

# variable grids are used by more than one module or can be changed (like albedo and soil storage)
$set $SurfStorSiltngUp = sfstsu//$grid//.$suffix
$set $Pondgridtopmodel = pond_top//$grid//.$suffix
$set $VegetationStart = vegstart//$grid//.$suffix
$set $VegetationStop = vegstop//$grid//.$suffix
$set $VegetationDuration = vegduration//$grid//.$suffix

[variable_grids]
1 # Number of variable grids to read
$outpath//$albedo albedo 1 0 # albedo; for time without snow derived from land use data
$Writegrid # Writegrid for $albedo
$readgrids # 0, if albedo is derived from land use at model start time, 1, if albedo is read from file

$outpath//$etr2etpgrid ETR2ETP 1 1 # effectice for wasim-richards only: ETR/ETP fraction, used for dynamic irrigation amount modelling in irrigation method 4
$Writegrid # effectice for wasim-richards only
0 # effectice for wasim-richards only
$outpath//$pondgridtopmodel ponding_storage_top 0 0 # effectice for wasimtop only: pond grid for lake modelling, nodata values grid must not be filled
$Writegrid # effectice for wasimtop only: Writegrid for topmodel-ponds
0 # effectice for wasimtop only: 0, if ponds should be initialized in routing model by the volume-waterlevel relation, 1 if actual pond content should be read in from existing pond grid
# $outpath//$glacierizedCells_grid GlacierizedCells 0 -9999 # glacierized fraction of each cell (0...1, -9999 for all-time non-glacierized cells) when using the dynamic glacier model; wasim will check if there are only nodata. If yes, the _ice_firn_ grid will be used for initialization of the glacier cells
# $Writegrid # Writegrid for glacierized cells
# 1 # $readgrids # should always be 1 since otherwise no glacier would be created
# $outpath//$glacier_codes_grid GlacierCodes 0 -9999 # codes for each single glacier. This grid is required when using the dynamic glacier model. It separates multiple glaciers even in the same subbasin for a applying the V-A-relation correctly
# $Writegrid # Writegrid for glacier codes
# 1 # $readgrids # should always be 1 since otherwise no glacier zones could be created in the dynamic glacier model
$outpath//$vegetationstart VegetationStart1 0 -1 # JD for start of vegetation period (is set to actual JD when Landusetable indicates the JD for start of vegetation is reached);
$Writegrid # Writegrid for $VegetationStart
$readgrids # 0, will only be read in when a simulation starts within the year somewhere
$outpath//$vegetationstop VegetationStop1 0 -1 # JD for end of vegetation period (is set to actual JD when Landusetable indicates the JD for the end of vegetation is reached);
$Writegrid # Writegrid for $VegetationStop
$readgrids # 0, will only be read in when a simulation starts within the year somewhere
$outpath//$vegetationduration VegetationDuration1 0 -1 # Daycount for actual vegetation period;
$Writegrid # Writegrid for $VegetationDuration
$readgrids # 0, will only be read in when a simulation starts within the year somewhere
$outpath//$soilstoragegrid soil_storage 1 0 # soil water storage
$Writegrid # Writegrid for this grid
$readgrids # 0, if soil_storage should be derived from soil types, 1, if it should be read from file
$outpath//$surfstorSiltngUp SurfStorSiltngUp 1 0 # storage for surface runoff which was routed into other grid cells but not into a cell with a river
$Writegrid # Writegrid for this grid
$readgrids # 0, if soil_storage should be derived from soil types, 1, if it should be read from file
$outpath//$forcingunitsgrid1 SumOfForcingUnits1 0 -1 # Sum of forcing units until phenological cycle starts
$Writegrid # Writegrid for this grid
0 # 0, if forcing units will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath//$TstartPhenoGrid1 Pheno_start1 0 -1 # actual starting day as calculated by forcing units sum
$Writegrid # Writegrid for this grid
0 # 0, if Tstart-Day units will be initialized to -1, otherwise it will be read in from a file (what for?)
$outpath//$chillingunitsgrid1 SumOfChillingUnits1 0 -1 # Sum of chilling units until DP2_t1_dorm is reached -> FStar is calculated dependent on this values
$Writegrid # Writegrid for this grid

```

```

$DPreadgrids # 0, if chilling units will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$FStargrid1 FStar_ForcingThreshold1 0 -1 # FStar value to be reached by the sum of forcing units until dynamic phenology
starts (only used by Method 4 in Landuse)
$Writegrid # Writegrid for this grid
0 # 0, if FStar will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$forcingunitsgrid2 SumOfForcingUnits2 0 -1 # Sum of forcing units until phenological cycle starts
$Writegrid # Writegrid for this grid
0 # 0, if forcing units will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$TStartPhenoGrid2 Pheno_start2 0 -1 # actual starting day as calculated by forcing units sum
$Writegrid # Writegrid for this grid
0 # 0, if TStart-Day units will be initialized to -1, otherwise it will be read in from a file (what for?)
$outpath/$chillingunitsgrid2 SumOfChillingUnits2 0 -1 # Sum of chilling units until DP2_t1_dorm is reached -> FStar is calculated
dependent on this values
$Writegrid # Writegrid for this grid
$DPreadgrids # 0, if chilling units will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$FStargrid2 FStar_ForcingThreshold2 0 -1 # FStar value to be reached by the sum of forcing units until dynamic phenology
starts (only used by Method 4 in Landuse)
$Writegrid # Writegrid for this grid
0 # 0, if FStar will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$forcingunitsgrid3 SumOfForcingUnits3 0 -1 # Sum of forcing units until phenological cycle starts
$Writegrid # Writegrid for this grid
0 # 0, if forcing units will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$TStartPhenoGrid3 Pheno_start3 0 -1 # actual starting day as calculated by forcing units sum
$Writegrid # Writegrid for this grid
0 # 0, if TStart-Day units will be initialized to -1, otherwise it will be read in from a file (what for?)
$outpath/$chillingunitsgrid3 SumOfChillingUnits3 0 -1 # Sum of chilling units until DP2_t1_dorm is reached -> FStar is calculated
dependent on this values
$Writegrid # Writegrid for this grid
$DPreadgrids # 0, if chilling units will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$FStargrid3 FStar_ForcingThreshold3 0 -1 # FStar value to be reached by the sum of forcing units until dynamic phenology
starts (only used by Method 4 in Landuse)
$Writegrid # Writegrid for this grid
0 # 0, if FStar will be initialized to 0, otherwise it will be read in from a file (what for?)
$outpath/$stavg_grid TemperatureAVG 1 0 # Average Temperature for a day (will be updated each day at the last interval (if
time step is smaller than 1d)
$Writegrid # Writegrid for this grid
0 # readgrid (not necessary for single day average temperature)
$outpath/$ThawDepthGrid PermafrostThawDepth 0 1 # grid with depth of thawed soil for permafrost soils, initialised with 0 in this
case (counts positive downwards)
3 # $Writegrid # Writegrid for this grid
0 # readgrid -> 0 if grid is not read in, 1 if grid will be read in
$outpath/$SnowFreeDaysGrid SnowFreeDaysGrid 0 0 # grid with number of effective snow-free days for permafrost soils (even if
there is snow, snow free days will be reset only after a certain number of snow cover days is reached)
3 # $Writegrid # Writegrid for this grid
0 # readgrid -> 0 if grid is not read in, 1 if grid will be read in
$outpath/$SnowCoverDaysGrid SnowCoverDaysGrid 0 31 # grid with number of snow cover days
3 # $Writegrid # Writegrid for this grid
0 # readgrid -> 0 if grid is not read in, 1 if grid will be read in

[model_time]
$starthour # start hour
$startday # start day
$startmonth # start month
$startyear # start year
$endhour # end hour
$endday # end day
$endmonth # end month
$endyear # end year

[meteo_data_count]
2

[meteo_names]
precipitation_cun20
precipitation_idw

[precipitation_cun20] # see section on interpolation for description of parameters
10
$inpath_meteo/precip_cun20.dat AdditionalColumns=0
820 1400 200 1 300 # lower inversion [m asl], upper inversion
# [m asl], tolerance [m], overlap [0/1 for true/false], clusterlimit [m]
#$inpath_meteo/precip_cun20.out
$outpath/$preci_grid1
$Writegrid
0.1
$outpath/precip_cun20_//$grid//.$code//$year $sum_per_24Invs

```

```

998
$IDWweight
0.75
$IDWmaxdist # max. distance of stations
$Anislope # slope of the anisotropy-ellipsis (-90+ to +90°)
$Anisotropie # ratio of short to long axis of the anisotropy-ellipsis
0.1 # lower limit of interpolation results
0 # replace value for results below the lower limit
900 # upper limit for interpolation results
900 # replace value
$SzenUse # 1=use scenario data for correction, 0=dont use scenarios
3 # 1=add scenarios, 2=multiply scenarios, 3=percentual change
1 # number of scenario cells
699000 235000 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
# coordinates of the cells, then one value for each month of a year

[precipitation_idw]
1 # method: 1=idw 2=regress 3=idw+regress 4=thiessen 5=bilinear 6=bilinear gradients and residuals linarly combined
7=spline 8=spline+regress
$inpath_meteo//preci_cun20.dat AdditionalColumns=0 # file name with station data (if method = 1,3,4,5,6,7,8 or 9 else ignored)
#0.01 # method 12 parameter: altitudinal gradient in (mm/d)/m --> 1mm per 100m
4000 4100 200 1 300 # regression parameters for precipitation
#inpath//precip.reg # file name with regression data (if method = 2 or 3)
$outpath//$preci_idw_grid # name of the output grid (is also used for deriving names of daily, monthly, yearly sums or averages)
$Writegrid # 0, if no grid-output is needed, else one of the codes described above
0.1 # correction faktor for results
$outpath//prec_idw//$grid//.$code//$startyear $sum_per_24Invs # file name for the statistic output (statially averaged values per time
step and subcatchment...)
998 # error value: all data in the input file greater than this values or lesser the negative value are nodata
$IDWweight # weighting of the reciprocal distance for IDW
0.80 # for interpolation method 3: relative weight of IDW-interpolation in the result
$IDWmaxdist # max. distance of stations to the actual interpolation cell
$Anislope # slope of the mean axis of the anisotropy-ellipsis (-90 ... +90 degree, mathem. positive)
$Anisotropie # ratio of the short to the long axis of the anisotropy-ellipsis
0.1 # lower limit of interpolation results
0 # replace value for results below the lower limit
900 # upper limit for interpolation results
900 # replace value for results with larger values than the upper limit
$SzenUse # 1=use scenario data for correction, 0=dont use scenarios
3 # 1=add scenarios, 2=multiply scenarios, 3=percentual change
1 # 4 # number of scenario cells
699000 235000 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 # koordinates of the cells, then one value for each month of a year

# ----- parameter for model components -----
#

[RegionalSuperposition]
1
$time
NumberOfEntities = 1;
precipitation {
    entityinputgrid = precipitation_cun20 ;
        regions = 1 ;
        weights = 0.3 ;
    entityinputgrid = precipitation_idw ;
        regions = 1 ;
        weights = 0.7 ;
    outputgrid = $outpath//$preci_grid ;
        writecode = $Writegrid ;
    outputtable = $outpath//prec//$grid//.$code//$startyear;
        statcode = $once_per_interval;
}

# for precipitation correction the paragraphs "precipitation" "temperature" and
# "wind_speed" are searched in the memory. If thea are not there (no definition in the control file for precipitation, wind or temperature),
# the prec. corr. will not be calculated

[precipitation_correction]
0 # 0=ignore this module, 1 = run the module
0.0 # Snow-rain-temperature
1.05 # liquid: b in: y = p(ax + b)
0.05 # liquid: a in: y = p(ax + b) = 1% more per m/s + 0.5% constant
1.20 # Snow: b in: y = p(ax + b)
0.25 # Snow: a in: y = p(ax + b) = 15% more per m/s + 45% constant

# correition factors for direct radiation are calculated

```



```

# if the cell is in the shadow of another cell, or if a cell is not in the sun (slope angle!)
# then the factor is 0.
# control_parameter: 1 = radiation correction WITH shadow WITHOUT temperature correction
#                   2 = radiation correction WITH shadow WITH temperature correction
#                   3 = radiation correction WITHOUT shadow WITHOUT temperature correction,
#                   4 = radiation correction WITHOUT shadow WITH Temperatur

[radiation_correction]
0 # 0=ignore this module, 1 = run the module
$time

[evapotranspiration]
0 # 0=ignore this module, 1 = run the module
$time

[snow_model]
0 # 0=ignore this module, 1 = run the module
$time

[ice_firn]
12 # method for glacier melt: 1=classical t-index, 2=t-index with correction by radiation, 11 = dyna
6.0 # t-index factor for ice
5.0 # t-index factor for firn
4.0 # t-index factor for snow
1.8 # melt factor
-0.00010 # radiation coefficient for ice_min (for meth
+0.00070 # radiation coefficient for ice_max (for meth
+0.00006 # radiation coefficient for snow_min (for meth
+0.00030 # radiation coefficient for snow_max (for meth
12 # els-konstante for ice
120 # els-konstante for firn
24 # els-konstante for snow
0.01 # initial reservoir content for ice discharge (single linear storage approach)
0.01 # initial reservoir content for firn discharge (single linear storage approach)
0.01 # initial reservoir content for snow discharge (single linear storage approach)
$outpath/$firn_melt # melt from firn
$Writegrid # 0, if no grid-output is needed, else one of the code
$outpath/$qfir/$grid//.$code/$year $once_per_interval # melt from firn as statistic file
$outpath/$ice_melt # melt from ice
$Writegrid # 0, if no grid-output is needed, else one of the code
$outpath/$qice/$grid//.$code/$year $once_per_interval # melt from ice as statistic file
$outpath/$qglc/$grid//.$code/$year $once_per_interval # discharge from snow, ice and firn as
# -----
# now some new parameters for the new dynamic glacier model (methods 11 and 12)
$outpath/$qsgl/$grid//.$code/$year $once_per_interval # melt from snow from glacier only as
$readgrids # 1=read grids and stacks from disk, 0=generat
7 2700 1.8 # number of layers for the firn stack, followe
09 30 # month and day (hour is set automatically to
28.5 1.36 10 4 # VAscaling and VAexponent for Volume-Area-Rel
$outpath/$firn_WE_stack # water equivalent for firn (given as stack, n
$Writestack # 0, if no grid-output is needed, else one of
$outpath/$glfirn/$grid//.$code/$year $once_per_interval
$outpath/$GlacierMassBalance # output grid with mass balance of the glacier
$Writegrid # 3: write at end of simulation (impor
$outpath/$OldGlacierMassBalance # output grid with mass balance of the glacier
$Writegrid # 3: write at end of simulation (impor
$outpath/$glmb/$grid//.$code/$year $sum_per_24Invs
$outpath/$glmb2/$grid//.$code/$year $sum_per_24Invs

[permafrost]
1 # method: 1=simple Alpha*sqrt(snow-free-days) approach to estimate thawdepth
30 # number of days with snow cover after which the soil is assumed ...
5 # maximum snow water equivalent for the interval to be counted as snow covered

[interception_model]
0 # 0=ignore this module, 1 = run the module
$time

[infiltration_model]
0 # 0=ignore this module, 1 = run the module
$time

[SiltingUpModel]
0 # 0=ignore this module, 1 = run the module
$time

```

[SurfaceRoutingModel]

```

0 # 0=ignore this module, 1 = run the module
$time # duration of a time step in minutes
2 # method: 1=MultipleFlowPaths for diverging areas, 2=single flowpaths (ne
$outpath//qdsr//$grid//.$code//$year $once_per_interval
$outpath//qjsr//$grid//.$code//$year $once_per_interval
$outpath//qbsr//$grid//.$code//$year $once_per_interval
$outpath//qgsr//$grid//.$code//$year $once_per_interval
$outpath//$surfspeed_grid # grid with actual flow velocity of surface flow in m/s
$Writegrid # writegrid for this grid
$outpath//$surfflux_grid # grid with actual flow amounts of surface flow in m^3/s
$Writegrid # writegrid for this grid
0.001 # maximum wake lenght iteration difference (if Delta_A_n1 < this value, i
40 # maximum number of iterations for a_NL
0.0001 # maximum flow velocity iteration difference (if Delta v is less than thi
40 # maximum number of iterations for v
30 # shortest sub-time step in seconds
3600 #longest allowed sub time step (even if flow travel times are longer, the
0.02 # minimum water depth for regarding roughenss of crops in m (shallower sh
2.0 # ConcentrationFactor takes into account the micro scale concentration of
$readgrids # readgrid code 0 do not read, 1 = read grids
$outpath//sfstsr//$grid//.$code//$year $once_per_interval

```

[lake_model]

```

0 # 0=ignore this module, 1 = run the module

```

[unsatzon_model]

```

1 # 0=ignore this module, 1 = run the module
$time # duration of a time step in minutes
3 # method, 1=simple method (will not work anymore from version 7.x), 2 = FDM-Method 3 = FDM-Method with dynamic time
step down to 1 second
1 # controlling interaction with surface water: 0 = no interaction, 1 = exfiltration possible 2 = infiltration and exfiltration possible
0 # controlling surface storage in ponds: 0 = no ponds, 1 = using ponds for surface storage (pond depth as standard grid
needed -> height of dams around fields)
0 # controlling artificial drainage: 0 = no artificial drainage 1 = using drainage (drainage depth and horizontal pipe
distances as standard grids needed!)
0 # controlling clay layer: 0 = no clay layer, 1 = assuming a clay layer in a depth, specified within a clay-grid
(declared as a standard grid)
5e-8 # permeability of the clay layer (is used for the clay layer only)
8 # parameter for the initialization of the gw_level (range between 1..levels (standard: 4))
$outpath//qdra//$grid//.$code//$year $sum_per_24Invs # results drainage discharge in mm per zone
$outpath//gwst//$grid//.$code//$year $avrg_per_24Invs # results groundwater depth
$outpath//gwn_//$grid//.$code//$year $sum_per_24Invs # results mean groundwater recharge per zone
$outpath//sb05//$grid//.$code//$year $avrg_per_24Invs # results rel. soil moisture within the root zone per zone
$outpath//sb1_//$grid//.$code//$year $avrg_per_24Invs # results rel. soil moisture within the unsat. zone (0m..GW table) per zone
$outpath//wurz//$grid//.$code//$year $avrg_per_24Invs # results statistic of the root depth per zone
$outpath//infx//$grid//.$code//$year $sum_per_24Invs # results statistic of the infiltration excess
$outpath//pond//$grid//.$code//$year $avrg_per_24Invs # results statistic of the ponding water storage content
$outpath//qdir//$grid//.$code//$year $once_per_interval # results statistic of the direct discharge
$outpath//qifl//$grid//.$code//$year $once_per_interval # results statistic of the interflow
$outpath//qbas//$grid//.$code//$year $once_per_interval # results statistic of the baseflow
$outpath//qges//$grid//.$code//$year $once_per_interval # results statistic of the total discharge
$outpath//gwin//$grid//.$code//$year $once_per_interval # statistic of the infiltration from surface water into groundwater (from rivers
and lakes)
$outpath//gwex//$grid//.$code//$year $once_per_interval # statistic of the exfiltration from groundwater into surface water (into rivers
and lakes)
$outpath//macr//$grid//.$code//$year $sum_per_24Invs # statistic of infiltration into macropores
$outpath//qinf//$grid//.$code//$year $once_per_interval # statistic of total infiltration into the first soil layer
$outpath//$SB_1_grid # grid with actual soil water content for the root zone
$Writegrid # Writecode for this grid
$outpath//$SB_2_grid # grid with actual soil water content for the entire unsaturated zone
$Writegrid # Writecode for this grid
$outpath//$ROOTgrid # grid with root depth
$Writegrid # Writecode for this grid
$outpath//$Thetastack # stack, actual soil water content for all soil levels
$Writegrid # Writecode for this stack
$outpath//$hydraulic_heads_stack # stack, containig hydraulic heads
$Writestack # Writecode for this stack
$outpath//$geodetic_altitude_stack # stack, containig geodaetic altitudes of the soil levels (lower boudaries)
$Writestack # Writecode for this stack
$outpath//$flowstack # stack, containing the outflows from the soil levels
$Writestack # Writecode for this stack
$outpath//$GWdepthgrid # grid with groudwaterdepth
$Writegrid # Writecode for this grid
$outpath//$GWthetagrid # grid with theta in GWLEVEL
$Writegrid # Writecode for this grid

```

```

$outpath/$GWNgrid          # grid with groundwater recharge
$Writegrid                 # Writecode for this grid
$outpath/$GWLEVELgrid      # grid with level index of groundwater surface (Index der Schicht)
$Writegrid                 # Writecode for this grid
$outpath/$QDRAINgrid       # grid with the drainage flows
$Writegrid                 # Writecode for this grid
$outpath/$SATgrid          # grid with code 1=saturation at interval start, 0 no sat.
$Writegrid                 # Writecode for this grid
$outpath/$INFEXgrid        # grid with infiltration excess in mm (surface discharge)
$Writegrid                 # Writecode for this grid
$outpath/$QDgrid           # grid with direct discharge
$Writegrid                 # Writecode for this grid
$outpath/$QIgrid           # grid with Interflow
$Writegrid                 # Writecode for this grid
$outpath/$QBgrid           # grid with baseflow
$Writegrid                 # Writecode for this grid
$outpath/$GWINgrid         # grid with infiltration from rivers into the soil (groundwater)
$Writegrid                 # Writecode for this grid
$outpath/$GWEXgrid         # grid with exfiltration (baseflow) from groundwater (is only generated, if groundwater module is
active, else baseflow is in QBgrid)
$Writegrid                 # Writecode for this grid
$outpath/$act_pond_grid    # grid with content of ponding storge
$Writegrid                 # Writecode for this grid
$outpath/$UPRISEgrid       # grid with amount of capillary uprise (mm)
$Writegrid                 # Writecode for this grid
$outpath/$PERCOLgrid       # grid with amount of percolation (mm)
$Writegrid                 # writegrid for this grid
$outpath/$MACROINFgrid     # grid with amount of infiltration into macropores (mm)
$Writegrid                 # Writecode for this grid
$outpath/$irrig_grid       # grid with irrigation amount (will be written when irrigation is used, only)
$Writegrid                 # writegrid for this grid (however: will be written when irrigation is used, only)
150 10                    # row/col coordinates of control plot, all theta and qu-values are written to files (qu.dat, theta.dat
in the directory, from which the model is started)
$outpath/qbot/$grid//.$code//$year # name of a file containing the flows between the layers of the control point
$outpath/thet/$grid//.$code//$year # name of a file containing the soil moisture as theta values of the layers of the control point
$outpath/hhyd/$grid//.$code//$year # name of a file containing the hydraulic head of the layers of the control point
$outpath/otherdata/$grid//.$code//$year # name of a file containing some other water balance data of the control point (non
layer data)
$outpath/etrd/$grid//.$code//$year # name of a file containing the withdrawal of soil water for each layer for the control point (due
to transpiration)
$outpath/intd/$grid//.$code//$year # name of a file containing the interflow for the soil layers of the control point
1      12                    # range for subbasin codes
5      5                     # kd
12     12                    # ki
10     10                    # dr
0.4    0.4                   # k in qb = Q0 * exp(-k/z) with z = depth to groundwater
0.1    0.1                   # Q0 in the above formula
0.2    0.2                   # fraction of surface runoff on snow melt
$readgrids                  # meanings are extended now! read the following comments
$outpath//storage_richards.ftz # if readgrids = 1, then this file contains the contents of the flow travel time
zones for interflow and surface flow and for the tracers
600                          # minimum dynamic time step in seconds. the smaller this
number, the longer the model runs but the results will be more accurate due to a maintained Courant condition
$outpath//step/$grid//.$code//$year $avrg_per_24Invs # results statistic of the number of substeps
$outpath/$SUBSTEPSgrid      # grid with number of substeps --> a good idea is to use
writecode 5x (e.g. 53) to get the average number of substeps per cell for the model run
$Writegrid                  # for substeps, the areal distribution is of interest for the annual average value. This is
code 6 as first digit in 2-digit codes. Or use 5 for the entire model run

[ExternalCoupling]
0 # 0 = no coupling, 1=coupling
$time

[irrigation]
0 # 0=ignore this module, 1 = run the module
$time

[groundwater_flow]
0 # 0=ignore the module, 1 = run the module
$time

[soil_model]
0 # 0=ignore this module, 1 = run the module
$time

[routing_model]

```

```

1 # 0=ignore this module, 1 = run the module, 2=run the module with
observed inflows into the routing channels (from discharge files)
$time
1 2400 90 24 # minimum/maximum specific discharge (l/s/km^2), number of log. fractions
of the range, splitting of the timeintervall (24= 1 hour-intervalls are splitted into 24 Intervalls each of 2.5 min. duration)
$outpath//qgko//$grid//.$code//$year $routing_code
$inpath//runoff.dat # input file with observed runoffs (if not available, this file will be ignored)
0 # number of following column descriptor (which column in the
spec. disch. file corresponds to which subbasin
0 # timeoffset
TG 2 (AE=4.363, AErel=1.0)
from OL 1 (kh=0.1, kv=0.4, Bh= 2.4, Bv= 9.6, Th= 0.27, Mh=25.0, Mv=10.0, l=0.0121, L=576.6, AE=3.189)
TG 3 (AE=6.098, AErel=1.0)
from OL 2 (kh=0.1, kv=0.4, Bh= 2.3, Bv= 9.4, Th= 0.30, Mh=25.0, Mv=10.0, l=0.0165, L=971.1, AE=4.363)
TG 4 (AE=7.308, AErel=1.0)
from OL 3 (kh=0.1, kv=0.4, Bh= 2.9, Bv= 11.7, Th= 0.34, Mh=25.0, Mv=10.0, l=0.0136, L=1474.6, AE=6.098)
TG 5 (AE=15.601, AErel=1.0)
from OL 4 (kh=0.1, kv=0.4, Bh= 3.3, Bv= 13.3, Th= 0.36, Mh=25.0, Mv=10.0, l=0.0119, L=168.3, AE=7.308)
TG 6 (AE=17.854, AErel=1.0)
from OL 5 (kh=0.1, kv=0.4, Bh= 4.9, Bv= 19.6, Th= 0.49, Mh=25.0, Mv=10.0, l=0.0089, L=673.1, AE=15.601)
TG 7 (AE=19.828, AErel=1.0)
from OL 6 (kh=0.1, kv=0.4, Bh= 5.4, Bv= 21.7, Th= 0.54, Mh=25.0, Mv=10.0, l=0.0068, L=1178.0, AE=17.854)
TG 8 (AE=21.872, AErel=1.0)
from OL 7 (kh=0.1, kv=0.4, Bh= 5.6, Bv= 22.3, Th= 0.56, Mh=25.0, Mv=10.0, l=0.0073, L=821.4, AE=19.828)
TG 9 (AE=26.429, AErel=1.0)
from OL 8 (kh=0.1, kv=0.4, Bh= 6.4, Bv= 25.5, Th= 0.64, Mh=25.0, Mv=10.0, l=0.0043, L=468.3, AE=21.872)
TG 10 (AE=27.295, AErel=1.0)
from OL 9 (kh=0.1, kv=0.4, Bh= 7.7, Bv= 30.7, Th= 0.77, Mh=25.0, Mv=10.0, l=0.0023, L=428.3, AE=26.429)
TG 11 (AE=29.258, AErel=1.0)
from OL 10 (kh=0.1, kv=0.4, Bh= 6.4, Bv= 25.5, Th= 0.64, Mh=25.0, Mv=10.0, l=0.0068, L=1036.6, AE=27.295)
TG 12 (AE=32.327, AErel=1.0)
from OL 11 (kh=0.1, kv=0.4, Bh= 7.0, Bv= 28.1, Th= 0.70, Mh=25.0, Mv=10.0, l=0.0046, L=1731.1, AE=29.258)
# abstraction rules are defined this way:
# first row: number of following columns, followed by the julian days for which rules will be established
# the Julian day describes the LAST day, the rule is valid for, so the year doesn't have to begin with 1
# but may begin with 31 instead to indicate, that rule one is valid for the entire January.
# Also, the last JD doesn't have to be 366 - when no other rule follows the actual rule, the last rule
# is valid until the end of the year
# other rows: discharge (m^3/s), followed by the abstraction valid for this discharge (m^3/s)

[abstraction_rule_abstraction_1]
4
20 0
20 7
27 7
27 8
TargetCap = 8

[abstraction_rule_abstraction_2]
12 60 91 121 182 213 244 366 # Julian Days; here: end of the months (rules
are valid for the period BEFORE the given JD)
# 28.02. 31.03. 30.04. 30.06. 31.07. 31.08. 31.12.
# 7 7.5 10.5 12.5 11 8.5 7 # Restwassermengen in m3/s
7 0 0 0 0 0 0 0
7.5 0.5 0 0 0 0 0 0.5
8.5 1.5 1 0 0 0 0 1.5
10.5 3.5 3 0 0 0 2 3.5
11 4 3.5 0.5 0 0 2.5 4
12.5 5.5 5 2 0 1.5 4 5.5
60 53 52.5 50.5 47.5 49 51.5 53
60.5 53 53 51 48 49.5 52 53
61.5 53 53 52 49 50.5 53 53
63.5 53 53 53 51 52.5 53 53
64 53 53 53 51.5 53 53 53
65.5 53 53 53 53 53 53 53
TargetCap = 60 60 60 60 60 60 60 60

[abstraction_rule_reservoir_1]
6
0 0
8.750e05 0
1.000e06 0.1
1.125e06 2.8
1.250e06 8
1.375e06 40

```

```

# the following section defines combinations of single landuse types to combinations of them.
# e.g. a landuse type deciduous forest may contain of oaks, bushes, and herbs, so each of those three components
# must be parameterised in the traditional landuse table. Example: oaks = code 1, bushes = code 2, herbs = code 3
# here, the combination of oaks, bushes and herbs will be parameterised like: 1 deciduous_forest { layers = 1, 2, 3;}
# The VCF (vegetation covered fraction) of each landuse will define the amount of water and radiation (except diffuse
# radiation which will go through the canopy layer) reaching the next layer. The uppermost layer must be listed first,
# the next layer follows then a.s.o.
# All multilayer-landuses must have an equal number of layers. Missing layers can be filled up from the end of the
# list using landuse code 9999, e.g. grassland would be defined in a 3-layer configuration by "2 grass {layers = 4, 9999, 9999;}
# When the multilayer_landuse table is used, the codes of the LANDUSE-Grid are referring no longer to the landuse_table
# anymore but to the multilayer_table following. The codes in the old landuse table are referring to the entries in the
# multilayer_landuse table
# declaring some common variables for vegetation period dependent grid-writing
# default (if not used in land use table at all) is JDVegReset = 1 and JDVegWrite = 365
$set $JDVegReset = 3
$set $JDVegWrite = 365

[multilayer_landuse]
9 # count of multilayer landuses
1 mixed_forest { Landuse_Layers = 1 ; # references to the landuse table: the first land use code is assumed to be the uppermosts
layer, the next one comes as scnd etc.
    k_extinct = 0.3; # extinction coefficient of d'Lambert-Beer's law for reducing radiation in its
way through the canopies (after COUPmodel, Jansson and Karlberg)
    LAI_scale = 20; # Scaling factor for calculating the aerodynamic resistencies of layer 2..n dependent
on the cumulated leaf area index (after COUPmodel, Jansson and Karlberg)
}
2 deciduous_forest { Landuse_Layers = 2; k_extinct = 0.3; LAI_scale = 20;}
3 water { Landuse_Layers = 3;k_extinct = 0.3; LAI_scale = 20;}
5 coniferous_forest { Landuse_Layers = 5; k_extinct = 0.3; LAI_scale = 20;}
7 Barrenland { Landuse_Layers = 7; k_extinct = 0.3; LAI_scale = 20;}
8 IceSnow { Landuse_Layers = 8; k_extinct = 0.3; LAI_scale = 20;}
9 agriculture { Landuse_Layers = 9; k_extinct = 0.3; LAI_scale = 20;}
10 extensivegrassland { Landuse_Layers = 10; k_extinct = 0.3; LAI_scale = 20;}
11 settlements { Landuse_Layers = 11; k_extinct = 0.3; LAI_scale = 20;}

[landuse_table]
9 # number of following land use codes, then aequences for land uses will follow
1 mixed_forest { method = VariableDayCount; # valid methods: "VariableDayCount" with variable number of fix points,
DynamicPhenology_1 which estimates the begin of the diurnal cycle in spring dependent on daily temperature sums only (other
methods will follow) --> old method: if the table is structured like the old ones, they are still valid
    RootDistr = 1.0; # parameter for root density distribution
    TReduWet = 0.95; # relative Theta value for beginning water stress (under wet conditions -> set >= 1 for
crop which doesn't depend on an aerial zone
    LimitReduWet = 0.5; # minimum relative reduction factor of real transpiration when water content reaches
saturation. The reduction factor value will go down linearly starting at 1.0 when relative Theta equals TReduWet (e.g. 0.95) to
LimitReduWet when the soil is saturated (Theta rel = 1.0)
    HReduDry = 3.45; # hydraulic head (suction) for beginning dryness stress (for water content resulting in
higher suctions, ETR will be reduced down to 0 at suction=150m)
    IntercepCap = 0.35; # optional: specific thickness of the water layer on the leaves in mm. if omitted here,
the dedfault parameter from interception_model is used
    JulDays = 15 46 74 105 135 166 196 227 258 288 319 349; # Julian days for all following
rows. Each parameter must match the number of julian days given here! The count of days doesn't matter.
    Albedo = 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15 0.15; # Albedo (snow free)
    rsc = 90 90 85 70 60 60 60 60 60 80 90 90; # leaf surface resistance in s/m
    rs_interception = 90 90 85 70 60 60 60 60 60 80 90 90; # INTERCEPTION surface
resistance in s/m
    rs_evaporation = 230 230 230 230 230 230 230 230 230 230 230 230; # SOIL
surface resistance in s/m (for evaporation only)
    LAI = 2 2 2 4 8 10 10 10 8 5 3 3; # Leaf Area Index (1/1)
    ZO = 3.0 3.0 3.0 5.0 8.0 10.0 10.0 10.0 9.0 5.0 3.0 3.0; # Roughness length in m
    VCF = 0.8 0.8 0.8 0.9 0.92 0.92 0.92 0.92 0.9 0.8 0.8 0.8; # Vegetation covered fraction
("Vegetationsbedeckungsgrad")
    RootDepth = 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3; # Root depth in m
    AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025; # Verschiebung des
Juldays pro Meter (positiv: wird nach hinten geschoben, negativ: wird nach vorne geschoben -> Limit: Wenn zwei Punkte
aufeinandertreffen, dann wird nicht weiter verschoben)
}
2 deciduous_forest { method = VariableDayCount; # valid methods: "VariableDayCount" with variable number of fix points
(other methods will follow) --> old method: if the table is structured like the old ones, they are still valid
    RootDistr = 1.0; # parameter for root density distribution
    TReduWet = 0.95; # relative Theta value for beginning water stress (under wet conditions -> set >= 1 for
crop which doesn't depend on an aerial zone
    LimitReduWet = 0.5; # minimum relative reduction factor of real transpiration when water content reaches
saturation. The reduction factor value will go down linearly starting at 1.0 when relative Theta equals TReduWet (e.g. 0.95) to
LimitReduWet when the soil is saturated (Theta rel = 1.0)
    HReduDry = 3.45; # hydraulic head (suction) for beginning dryness stress (for water content resulting in

```

higher suctions, ETR will be reduced down to 0 at suction=150m)

```

IntercepCap = 0.3; # optional: specific thickness of the water layer on the leaves in mm. if omitted here,
the default parameter from interception_model is used
JulDays = 15 46 74 105 135 166 196 227 258 288 319 349; # Julian days for all following
rows. Each parameter must match the number of julian days given here! The count of days doesn't matter.
Albedo = 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17 0.17; # Albedo (snow free)
rsc = 100 100 95 75 65 65 65 65 65 85 100 100; # leaf surface resistance in s/m
rs_interception = 100 100 95 75 65 65 65 65 65 85 100 100; # INTERCEPTION surface
resistance in s/m
rs_evaporation = 220 220 220 220 220 220 220 220 220 220 220 220; # SOIL surface resistance in
s/m (for evaporation only)
LAI = 0.5 0.5 0.5 3 8 8 8 8 8 3 0.5 0.5; # Leaf Area Index (1/1)
ZO = 0.3 0.3 0.3 3.0 8.00 10.0 10.0 10.0 10.0 3.0 0.5 0.3; # Roughness length in m
VCF = 0.7 0.7 0.7 0.8 0.95 0.95 0.95 0.95 0.9 0.8 0.7 0.7; # Vegetation covered fraction
("Vegetationsbedeckungsgrad")
RootDepth = 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4; # Root depth in m
AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025; # Verschiebung des
Juldays pro Meter (positiv: wird nach hinten geschoben, negativ: wird nach vorne geschoben -> Limit: Wenn zwei Punkte
aufeinandertreffen, dann wird nicht weiter verschoben)
}
3 water { method = VariableDayCount; # valid methods: "VariableDayCount" with variable number of fix points (other
methods will follow) --> old method: if the table is structured like the old ones, they are still valid
RootDistr = 1.0; # parameter for root density distribution
TReduWet = 0.95; # relative Theta value for beginning water stress (under wet conditions -> set >= 1 for
crop which doesn't depend on an aeral zone
LimitReduWet = 0.5; # minimum relative reduction factor of real transpiration when water content reaches
saturation. The reduction factor value will go down linearly starting at 1.0 when relative Theta equals TReduWet (e.g. 0.95) to
LimitReduWet when the soil is saturated (Theta rel = 1.0)
HReduDry = 3.45; # hydraulic head (suction) for beginning dryness stress (for water content resulting in
higher suctions, ETR will be reduced down to 0 at suction=150m)
IntercepCap = 0; # optional: specific thickness of the water layer on the leaves in mm. if omitted here,
the default parameter from interception_model is used
JulDays = 15 46 74 105 135 166 196 227 258 288 319 349; # Julian days for all following
rows. Each parameter must match the number of julian days given here! The count of days doesn't matter. The count of days doesn't
matter.
Albedo = 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05; # Albedo (snow free)
rsc = 20 20 20 20 20 20 20 20 20 20 20 20; # leaf surface resistance in s/m
rs_interception = 20 20 20 20 20 20 20 20 20 20 20 20; # INTERCEPTION surface resistance
in s/m
LAI = 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0; # Leaf Area Index (1/1)
ZO = 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01; # Roughness length in m
VCF = 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1; # Vegetation covered fraction
("Vegetationsbedeckungsgrad")
RootDepth = 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01; # Root depth in m
AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025; # Verschiebung des
Juldays pro Meter (positiv: wird nach hinten geschoben, negativ: wird nach vorne geschoben -> Limit: Wenn zwei Punkte
aufeinandertreffen, dann wird nicht weiter verschoben)
}
5 coniferous_forest { method = VariableDayCount; # valid methods: "VariableDayCount" with variable number of fix points
(other methods will follow) --> old method: if the table is structured like the old ones, they are still valid
SoilTillage = 90 240; # optional set of 1..n Julian days, depicting days with soil tillage. Important for silting up model
RootDistr = 1.0; # parameter for root density distribution
TReduWet = 0.95; # relative Theta value for beginning water stress (under wet conditions -> set >= 1 for
crop which doesn't depend on an aeral zone
LimitReduWet = 0.5; # minimum relative reduction factor of real transpiration when water content reaches
saturation. The reduction factor value will go down linearly starting at 1.0 when relative Theta equals TReduWet (e.g. 0.95) to
LimitReduWet when the soil is saturated (Theta rel = 1.0)
HReduDry = 3.45; # hydraulic head (suction) for beginning dryness stress (for water content resulting in
higher suctions, ETR will be reduced down to 0 at suction=150m)
IntercepCap = 0.4; # optional: specific thickness of the water layer on the leaves in mm. if omitted here,
the default parameter from interception_model is used
JulDays = 15 46 74 105 135 166 196 227 258 288 319 349; # Julian days for all following
rows. Each parameter must match the number of julian days given here! The count of days doesn't matter.
Albedo = 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12; # Albedo (snow free)
rsc = 80 80 75 65 55 55 55 55 55 75 80 80; # leaf surface resistance in s/m
rs_interception = 80 80 75 65 55 55 55 55 55 75 80 80; # INTERCEPTION surface resistance
in s/m
rs_evaporation = 220 220 220 220 220 220 220 220 220 220 220 220; # SOIL surface resistance in
s/m (for evaporation only)
LAI = 8.0 8.0 8.0 9.0 12.0 12.0 12.0 12.0 11.0 10.0 8.0 8.0; # Leaf Area Index (1/1)
ZO = 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0; # Roughness length in m
VCF = 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9; # Vegetation covered fraction
("Vegetationsbedeckungsgrad")
RootDepth = 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2; # Root depth in m
AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025; # Verschiebung des
Juldays pro Meter (positiv: wird nach hinten geschoben, negativ: wird nach vorne geschoben -> Limit: Wenn zwei Punkte

```

aufeinandertreffen, dann wird nicht weiter verschoben)

```

}
7 BarrenLand {method = VariableDayCount; # valid methods:
"VariableDayCount" with variable number of fix points (other methods will follow) --> old method: if the table is structured like the old
ones, they are still valid
    RootDistr = 1.0; # parameter for root density distribution
    TReduWet = 0.95; # relative Theta value for beginning water stress (under wet conditions -> set >= 1 for crop
which doesn't depend on an aeral zone
    LimitReduWet = 0.5; # minimum relative reduction factor of real transpiration when water content reaches
saturation. The reduction factor value will go down linearly starting at 1.0 when relative Theta equals TReduWet (e.g. 0.95) to
LimitReduWet when the soil is saturated (Theta rel = 1.0)
    HReduDry = 0.5; # hydraulic head (suction) for beginning dryness stress (for water content resulting in higher
suctions, ETR will be reduced down to 0 at suction=150m)
    IntercepCap = 0.1; # optional: specific thickness of the water layer on the leafes in mm. if omitted here, the dedfault
parameter from interception_model is used
    JulDays = 15 46 74 105 135 166 196 227 258 288 319 349 ; # Julian days for all following
rows. Each parameter must match the number of julian days given here! The count of days doesn't matter.
    Albedo = 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12 0.12; # Albedo (snow free)
    rsc = 250 250 200 150 150 120 100 90 100 150 200 250; # leaf surface resistance in s/m
    rs_interception = 80 80 75 65 55 55 55 55 55 75 80 80; # INTERCEPTION surface resistance in s/m
    rs_evaporation = 220 220 220 220 220 220 220 220 220 220 220 220; # SOIL surface resistance in
s/m (for evaporation only)
    LAI = 1.0 1.0 1.0 1.2 1.5 1.7 1.8 1.8 1.4 1.0 1.0 1.0; # Leaf Area Index (1/1)
    Z0 = 0.05 0.05 0.05 0.10 0.15 0.15 0.15 0.15 0.15 0.10 0.05 0.05; # Roughness length in m
    VCF = 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8; # Vegetation covered fraction
("Vegetationsbedeckungsgrad")
    RootDepth = 0.1 0.1 0.1 0.15 0.15 0.2 0.2 0.2 0.2 0.15 0.1 0.1; # Root depth in m
    AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025; # Verschiebung des
Juldays pro Meter (positiv: wird nach hinten geschoben, negativ: wird nach vorne geschoben -> Limit: Wenn zwei Punkte
aufeinandertreffen, dann wird nicht weiter verschoben)
}
8 IceSnow {method = VariableDayCount; # valid methods: "VariableDayCount" with
variable number of fix points (other methods will follow) --> old method: if the table is structured like the old ones, they are still valid
    RootDistr = 1.0; # parameter for root density distribution
    TReduWet = 0.95; # relative Theta value for beginning water stress (under wet conditions -> set >= 1 for crop
which doesn't depend on an aeral zone
    LimitReduWet = 0.5; # minimum relative reduction factor of real transpiration when water content reaches
saturation. The reduction factor value will go down linearly starting at 1.0 when relative Theta equals TReduWet (e.g. 0.95) to
LimitReduWet when the soil is saturated (Theta rel = 1.0)
    HReduDry = 0.5; # hydraulic head (suction) for beginning dryness stress (for water content resulting in higher
suctions, ETR will be reduced down to 0 at suction=150m)
    IntercepCap = 0.1; # optional: specific thickness of the water layer on the leafes in mm. if omitted here, the dedfault
parameter from interception_model is used
    JulDays = 15 46 74 105 135 166 196 227 258 288 319 349 ; # Julian days for all following
rows. Each parameter must match the number of julian days given here! The count of days doesn't matter.
    Albedo = 0.82 0.82 0.82 0.82 0.72 0.62 0.52 0.52 0.52 0.62 0.72 0.82; # Albedo (snow free)
    rsc = 50 50 50 50 50 50 50 50 50 50 50 50; # leaf surface resistance in s/m
    rs_interception = 50 50 50 50 50 50 50 50 50 50 50 50; # INTERCEPTION surface resistance in s/m
    rs_evaporation = 50 50 50 50 50 50 50 50 50 50 50 50; # SOIL surface resistance in s/m (for
evaporation only)
    LAI = 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0; # Leaf Area Index (1/1)
    Z0 = 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02 0.02; # Roughness length in m
    VCF = 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8; # Vegetation covered fraction
("Vegetationsbedeckungsgrad")
    RootDepth = 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1; # Root depth in m
    AltDep = 0 0 0 0 0 0 0 0 0 0 0 0; # Verschiebung des Juldays pro Meter (positiv: wird nach hinten geschoben, negativ: wird nach vorne geschoben ->
Limit: Wenn zwei Punkte aufeinandertreffen, dann wird nicht weiter verschoben)
}
9 agriculture {method = VariableDayCount;
    RootDistr = 1.0;
    TReduWet = 0.95;
    LimitReduWet = 0.5;
    HReduDry = 3.5;
    IntercepCap = 0.4;
    JulDays = 15 46 74 105 135 166 196 227 258 288 319 349 ;
    Albedo = 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 ;
    rsc = 80 80 75 75 65 55 55 55 65 75 90 90 ;
    rs_interception = 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ;
    rs_evaporation = 200 200 200 200 200 200 200 200 200 200 200 200 ;
    LAI = 1 1 2 3 4 5 5 4 3 2 1 1 ;
    Z0 = 0.03 0.03 0.03 0.04 0.05 0.05 0.05 0.05 0.04 0.03 0.03 0.03 ;
    VCF = 0.3 0.3 0.3 0.7 0.8 0.95 0.95 0.8 0.7 0.3 0.3 0.3 ;
    RootDepth = 0.15 0.15 0.2 0.4 0.5 0.5 0.5 0.5 0.4 0.2 0.15 0.15 ;
    AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025;
}

```

```

10 extensive_grassland {method = VariableDayCount;
    RootDistr = 1.0;
    TReduWet = 0.95;
    LimitReduWet = 0.5;
    HReduDry = 3.5;
    IntercepCap = 0.4;
    JulDays = 15 46 74 105 135 166 196 227 258 288 319 349 ;
    Albedo = 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25 ;
    rsc = 90 90 80 70 60 55 50 55 60 70 90 90 ;
    rs_interception = 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ;
    rs_evaporation = 600 600 600 600 600 600 600 600 600 600 600 600 ;
    LAI = 2 2 2 2 3 3 3 3 3 2 2 2 ;
    Z0 = 0.03 0.03 0.03 0.04 0.04 0.04 0.04 0.04 0.04 0.03 0.03 0.03 ;
    VCF = 0.8 0.8 0.8 0.9 0.9 0.9 0.9 0.9 0.8 0.8 0.8 0.8 ;
    RootDepth = 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 ;
    AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025 ;
}

11 settlements {method = VariableDayCount;
    RootDistr = 1.0;
    TReduWet = 0.95;
    LimitReduWet = 0.5;
    HReduDry = 3.5;
    IntercepCap = 0.2;
    JulDays = 15 46 74 105 135 166 196 227 258 288 319 349 ;
    Albedo = 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 ;
    rsc = 100 100 100 100 100 100 100 100 100 100 100 100 ;
    rs_interception = 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ;
    rs_evaporation = 200 200 200 200 200 200 200 200 200 200 200 200 ;
    LAI = 1 1 1 1 1 1 1 1 1 1 1 1 ;
    Z0 = 1 1 1 1 1 1 1 1 1 1 1 1 ;
    VCF = 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 ;
    RootDepth = 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 ;
    AltDep = 0.025 0.025 0.025 0.025 0.025 0.025 -0.025 -0.025 -0.025 -0.025 -0.025 -0.025 ;
}

```

```

# for DynamicPhenology_1, one julian day in spring must be named "-1" which means the TStart-day. The next julian day will be
# interpreted as Delta to the Tstart-day
# the "Tstart"-day will be the day, the F* calculation starts from (i.e. end of Dormation period), the Delta1 will be the end of the leaves
# unfolding-time.
# all other julian days before and after this two days will still be handled in the usual way (as in Variable Day Count)
# if a julian day "moves" into the time-span of the two special days, it will be ignored.
# Tstart and the next julian day will not be altitude dependent, the other days will.
# There will be no interpolation of Parameters between the Julian day before Tstart and Tstart (because we don't know Tstart in
# advance)
#
# to use the DynamicPhenology_1, F*, t1_dorm and TBf must be given as Parameters
# Also, a number of grids must be hold in memory (and they will be modelled after each time step), like:
# - actual sum of forcing units (per layer) (also called F in the equations)
# - TStart as julian day (per layer), if Sum(F)>F* --> Phase was started already (otherwise: -9999)
# Ablauf: in InterpolateTVarParams muss festgestellt werden, ob der aktuelle Tag < Tstart ist.
# Wenn ja: Alte Werte weiterverwenden (keine Interpolation)
# Wenn nein: prüfen, ob Tstart-Grid schon einen Wert hat.
# TStart schon bekannt (und auch Delta): mit diesen Werten weiterrechnen, falls Julian Day innerhalb TStart bis TStart+Delta liegt,
# sonst ebenfalls normal weitermachen mit den festgelegten Werten
# TStart nicht bekannt: Forcing units berechnen und im F-Grid aufsummieren (nach Formel 12b)
# -> weiter die alten Werte verwenden von vor Tstart
# Für die Berechnung der Forcing units wird die Temperatur benötigt sowie die fixen Parameter F* und T_Bf
#
# Für die interne Abarbeitung:
# - beim EINlesen der Tabelle wird für den Julian-Day, an welchem "-1" steht, die Nummer der SPalte wird als Tstart gespeichert
# (neues Member-Feld der LU-Tabelle. Der Zugriff auf den Julian Day erfolgt dann zwischen Tstart und Delta indirekt über das Tstart-
# Array
# - der nächste Wert wird als Delta ebenfalls in neuem Member gespeichert -> nachdem Tstart feststeht, wird er intern durch
# Tstart+Delta ersetzt und
# wird dann normal wie alle anderen Julian Days behandelt
# - beim Beginn eines neuen Jahres wird (bzw. bei Erreichen des Julian days JDRreset_Tstart) das Tstart-Grid -1 gesetzt, FORC wird
# auf 0 gesetzt.
#
# internal used: Tstart as julian day for t_start
# Tstart_col: welcher der x julian days ist eigentlich tstart (gewöhnlich der zweite, muss aber nicht sein)
#

```

```

[soil_table]
17 # number of following entries
#co- name of the
#de soil profile

```


#- -----

050101 L_S_S {method = MultipleHorizons;

FCap = 12.90; mSB = 35.2; ksat_topmodel = 2.89E-6; suction = 352; # optional parameters

which are needed for Topmodel only

GrainSizeDist = 0.4 0.4 0.2 0.0 0.0 0.0 0.0; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.

PMacroThresh = 20 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.0 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = L01m S02m S10m ; # short descriptions

ksat = 2.85e-6 8.25e-5 8.25e-5 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

theta_sat = 0.43 0.43 0.43 ; # saturated water content (fillable porosity in 1/1)

theta_res = 0.078 0.057 0.057 ; # residual water content (in 1/1, water content which cannot be poured by transpiration, only by evaporation)

alpha = 3.60 7.00 7.00 ; # van Genuchten Parameter Alpha

Par_n = 1.56 1.70 1.70 ; # van Genuchten Parameter n

Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-

Genuchten-Gleichung (dort normalerweise 0.5)

thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m

layers = 1 2 59; # numerical number of layers in this horizon. The thickness of the layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)

}

031212 SL_SI_SI {method = MultipleHorizons;

FCap = 12.28; mSB = 34.5; ksat_topmodel = 1.23E-5; suction = 383; # optional parameters

which are needed for Topmodel only

GrainSizeDist = 0.55 0.15 0.2 0.05 0.03 0.02 0.0; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.

PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 5 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.9 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.5 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = SL1m SI2m SI10m ; # short descriptions

ksat = 1.23e-5 6.94e-7 6.94e-7 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

theta_sat = 0.41 0.46 0.46 ; # saturated water content (fillable porosity in 1/1)

theta_res = 0.065 0.034 0.034 ; # residual water content (in 1/1, water content which cannot be poured by transpiration, only by evaporation)

alpha = 7.5 1.60 1.60 ; # van Genuchten Parameter Alpha

Par_n = 1.89 1.37 1.37 ; # van Genuchten Parameter n

Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-

Genuchten-Gleichung (dort normalerweise 0.5)

thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m

layers = 1 2 59; # numerical number of layers in this horizon. The thickness of the layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)

}

010707 S_SIC_SIC {method = MultipleHorizons;

FCap = 6.21; mSB = 38.5; ksat_topmodel = 8.25E-5; suction = 385; # optional parameters

which are needed for Topmodel only

GrainSizeDist = 0.55 0.15 0.2 0.05 0.03 0.02 0.0; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.

PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 5 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.9 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.5 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

```

Name = S01m SIC02m SIC10m ; # short descriptions
ksat = 6.21e-5 5.56e-8 5.56e-8 ; # saturated hydraulic conductivity in m/s
k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0
theta_sat = 0.43 0.36 0.36 ; # saturated water content (fillable porosity in 1/1)
theta_res = 0.057 0.070 0.070 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
alpha = 7.0 0.5 0.50 ; # van Genuchten Parameter Alpha
Par_n = 1.70 1.09 1.09 ; # van Genuchten Parameter n
Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
layers = 1 2 59; # numerical number of layers in this horizon. The thickness of the layer is
given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
}
030101 SL_S_S {method = MultipleHorizons;
FCap = 12.28; mSB = 34.5; ksat_topmodel = 1.23E-5; suction = 345; # optional parameters
which are needed for Topmodel only
GrainSizeDist = 0.55 0.15 0.2 0.05 0.03 0.02 0.0; # optional: when using silting up model, the
grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
63mm, Stones4=63-200mm.
PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour
(not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
MacroCapacity = 5 ; # capacity of the macropores in mm per hour (not in m/s, because it's
more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
CapacityRedu = 0.9 ; # reduction of the macropore capacity with depth -> pores become less
dense. This Factor describes the reduction ratio per meter
MacroDepth = 1.5 ; # maximum depth of the macropores
horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the
horizons shortly in the following row
Name = SL01m S02m S10m ; # short descriptions
ksat = 1.23e-5 8.25e-5 8.25e-5 ; # saturated hydraulic conductivity in m/s
k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0
theta_sat = 0.41 0.43 0.43 ; # saturated water content (fillable porosity in 1/1)
theta_res = 0.065 0.057 0.057 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
alpha = 7.5 7.00 7.00 ; # van Genuchten Parameter Alpha
Par_n = 1.89 1.70 1.70 ; # van Genuchten Parameter n
Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
layers = 1 2 59; # numerical number of layers in this horizon. The thickness of the layer is
given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
}
120606 SI_SC_SC {method = MultipleHorizons;
FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
which are needed for Topmodel only
GrainSizeDist = 0.55 0.15 0.2 0.05 0.03 0.02 0.0; # optional: when using silting up model, the
grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
63mm, Stones4=63-200mm.
PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour
(not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
MacroCapacity = 5 ; # capacity of the macropores in mm per hour (not in m/s, because it's
more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
CapacityRedu = 0.9 ; # reduction of the macropore capacity with depth -> pores become less
dense. This Factor describes the reduction ratio per meter
MacroDepth = 1.5 ; # maximum depth of the macropores
horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the
horizons shortly in the following row
Name = SI01m SC02m SC10m ; # short descriptions
ksat = 6.94e-7 3.33e-7 3.33e-7 ; # saturated hydraulic conductivity in m/s
k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0
theta_sat = 0.46 0.38 0.38 ; # saturated water content (fillable porosity in 1/1)
theta_res = 0.034 0.01 0.01 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
alpha = 1.6 2.70 2.70 ; # van Genuchten Parameter Alpha
Par_n = 1.37 1.23 1.23 ; # van Genuchten Parameter n
Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
layers = 1 2 59; # numerical number of layers in this horizon. The thickness of the layer is
given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
}
120101_SI_S_S {method = MultipleHorizons;

```

FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
 which are needed for Topmodel only

GrainSizeDist = 0.55 0.15 0.2 0.05 0.03 0.02 0.0; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.

PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 5 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.9 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.5 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = SI01m S02m S10m ; # short descriptions

ksat = 6.94e-7 8.25e-5 8.25e-5 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

theta_sat = 0.46 0.43 0.43 ; # saturated water content (fillable porosity in 1/1)

theta_res = 0.034 0.057 0.057 ; # residual water content (in 1/1, water content which cannot be poured by transpiration, only by evaporation)

alpha = 1.6 7.00 7.00 ; # van Genuchten Parameter Alpha

Par_n = 1.37 1.7 1.7 ; # van Genuchten Parameter n

Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-Genuchten-Gleichung (dort normalerweise 0.5)

thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m

layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)

}
 121212 SI_SI_SI {method = MultipleHorizons;

FCap = 12.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
 which are needed for Topmodel only

GrainSizeDist = 0.39 0.20 0.32 0.06 0.02 0.01 0.00; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here

PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 4 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 1.0 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.5 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = SI01m SI02m SI10m ; # short descriptions

ksat = 6.94E-7 6.94E-7 6.94E-7 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

theta_sat = 0.46 0.46 0.46 ; # saturated water content (fillable porosity in 1/1)

theta_res = 0.034 0.034 0.034 ; # residual water content (in 1/1, water content which cannot be poured by transpiration, only by evaporation)

alpha = 1.6 1.60 1.60 ; # van Genuchten Parameter Alpha

Par_n = 1.37 1.37 1.37 ; # van Genuchten Parameter n

Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-Genuchten-Gleichung (dort normalerweise 0.5)

thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m

layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)

}
 120303 SI_SL_SL {method = MultipleHorizons;

FCap = 12.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
 which are needed for Topmodel only

GrainSizeDist = 0.39 0.20 0.32 0.06 0.02 0.01 0.00; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here

PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 4 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 1.0 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.5 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = SI01m SL02m SL10m ; # short descriptions

ksat = 6.94e-7 1.03e-6 1.03e-6 ; # saturated hydraulic conductivity in m/s

```

        k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0
        theta_sat = 0.46 0.40 0.40 ; # saturated water content (fillable porosity in 1/1)
        theta_res = 0.034 0.065 0.065 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
        alpha = 1.00 1.00 7.50 ; # van Genuchten Parameter Alpha
        Par_n = 1.23 1.23 1.89 ; # van Genuchten Parameter n
        Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
        thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
        layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the
layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
    }
030303 SL_SL_SL {method = MultipleHorizons;
        FCap = 12.28; mSB = 34.5; ksat_topmodel = 1.23E-5; suction = 345; # optional parameters
which are needed for Topmodel only
        GrainSizeDist = 0.39 0.20 0.32 0.06 0.02 0.01 0.00; # optional: when using silting up model,
the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here
        PMacroThresh = 15 ; # precipitation capacity thresholding macropore runoff in mm per hour
(not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
        MacroCapacity = 4 ; # capacity of the macropores in mm per hour (not in m/s, because it's
more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
        CapacityRedu = 1.0 ; # reduction of the macropore capacity with depth -> pores become less
dense. This Factor describes the reduction ratio per meter
        MacroDepth = 1.5 ; # maximum depth of the macropores
        horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the
horizons shortly in the following row
        Name = SL01m SL02m SL10m ; # short descriptions
        ksat = 1.5e-7 1.5e-7 1.23e-7 ; # saturated hydraulic conductivity in m/s
        k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0
        theta_sat = 0.43 0.43 0.43 ; # saturated water content (fillable porosity in 1/1)
        theta_res = 0.089 0.089 0.089 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
        alpha = 1.00 1.00 1.00 ; # van Genuchten Parameter Alpha
        Par_n = 1.23 1.23 1.23 ; # van Genuchten Parameter n
        Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
        thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
        layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the
layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
    }
010404 S_SIC_SIC {method = MultipleHorizons;
        FCap = 6.21; mSB = 38.5; ksat_topmodel = 8.25E-5; suction = 385; # optional parameters
which are needed for Topmodel only
        GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the
grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here
        PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour
(not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
        MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's
more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
        CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less
dense. This Factor describes the reduction ratio per meter
        MacroDepth = 1.2 ; # maximum depth of the macropores
        horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the
horizons shortly in the following row
        Name = S01m SIC02m SIC10m ; # short descriptions
        ksat = 8.25e-5 5.56e-8 5.56e-8 ; # saturated hydraulic conductivity in m/s
        k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0
        theta_sat = 0.43 0.36 0.36 ; # saturated water content (fillable porosity in 1/1)
        theta_res = 0.057 0.07 0.07 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
        alpha = 7.0 0.50 0.50 ; # van Genuchten Parameter Alpha
        Par_n = 1.71 1.09 1.09 ; # van Genuchten Parameter n
        Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
        thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
        layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the
layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
    }
100101 R_S_S {method = MultipleHorizons;
        FCap = 14.00; mSB = 15.0; ksat_topmodel = 5.56E-8; suction = 150; # optional parameters
which are needed for Topmodel only

```

GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here

PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.2 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = R01m S02m S10m ; # short descriptions

ksat = 5.56e-8 8.25e-5 8.25e-5 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

theta_sat = 0.20 0.43 0.43 ; # saturated water content (fillable porosity in 1/1)

theta_res = 0.04 0.057 0.057 ; # residual water content (in 1/1, water content which cannot be poured by transpiration, only by evaporation)

alpha = 8.00 7.00 7.00 ; # van Genuchten Parameter Alpha

Par_n = 1.80 1.70 1.70 ; # van Genuchten Parameter n

Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-Genuchten-Gleichung (dort normalerweise 0.5)

thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m

layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)

}
120505 SI_L_L {method = MultipleHorizons;
FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
which are needed for Topmodel only

GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here

PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.2 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = SI01m L02m L10m ; # short descriptions

ksat = 6.94e-7 2.89e-6 2.89e-6 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

theta_sat = 0.46 0.43 0.43 ; # saturated water content (fillable porosity in 1/1)

theta_res = 0.034 0.078 0.078 ; # residual water content (in 1/1, water content which cannot be poured by transpiration, only by evaporation)

alpha = 1.6 3.60 3.60 ; # van Genuchten Parameter Alpha

Par_n = 1.37 1.56 1.56 ; # van Genuchten Parameter n

Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-Genuchten-Gleichung (dort normalerweise 0.5)

thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m

layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)

}
121414 SI_SCL_SCL {method = MultipleHorizons;
FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
which are needed for Topmodel only

GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here

PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)

CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less dense. This Factor describes the reduction ratio per meter

MacroDepth = 1.2 ; # maximum depth of the macropores

horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the horizons shortly in the following row

Name = SI01m SCL02m SCL10m ; # short descriptions

ksat = 6.94e-7 2.89e-6 2.89e-6 ; # saturated hydraulic conductivity in m/s

k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different layers if no k decrease is wanted (set this parameter to 1.0

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theta_sat      = 0.46  0.38  0.38  ; # saturated water content (fillable porosity in 1/1)
theta_res      = 0.034  0.078  0.078  ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
alpha         = 1.6   3.60  3.65  ; # van Genuchten Parameter Alpha
Par_n         = 1.37  1.56  1.67  ; # van Genuchten Parameter n
Par_tau       = 0.5   0.5   0.5   ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
thickness     = 0.1   0.1   0.3333 ; # thickness of each single numerical layer in this horizon in m
layers        = 1     2     59     ; # numerical number of layers in this horizon. The thickness of the
layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
}
120301 SI_SL_S {method = MultipleHorizons;
FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
which are needed for Topmodel only
GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the
grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here
PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour
(not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's
more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less
dense. This Factor describes the reduction ratio per meter
MacroDepth = 1.2 ; # maximum depth of the macropores
horizon      = 1     2     3     ; # ID of the horizon (must be ascendent) it's recommended to name the
horizons shortly in the following row
Name         = SI01m SL02m S10m ; # short descriptions
ksat         = 6.94e-7 1.23e-5 8.25e-5 ; # saturated hydraulic conductivity in m/s
k_recession  = 0.8   0.9   1.0   ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0)
theta_sat    = 0.46  0.41  0.43  ; # saturated water content (fillable porosity in 1/1)
theta_res    = 0.034  0.065  0.057 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
alpha       = 1.6   7.5   7.00  ; # van Genuchten Parameter Alpha
Par_n       = 1.37  1.89  1.69  ; # van Genuchten Parameter n
Par_tau     = 0.5   0.5   0.5   ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
thickness   = 0.1   0.1   0.3333 ; # thickness of each single numerical layer in this horizon in m
layers      = 1     2     59     ; # numerical number of layers in this horizon. The thickness of the
layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
}
121401 SI_SCL_S {method = MultipleHorizons;
FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
which are needed for Topmodel only
GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the
grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here
PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour
(not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's
more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less
dense. This Factor describes the reduction ratio per meter
MacroDepth = 1.2 ; # maximum depth of the macropores
horizon      = 1     2     3     ; # ID of the horizon (must be ascendent) it's recommended to name the
horizons shortly in the following row
Name         = SI01m SCL02m S10m ; # short descriptions
ksat         = 6.94e-7 3.64e-6 8.25e-5 ; # saturated hydraulic conductivity in m/s
k_recession  = 0.8   0.9   1.0   ; # k sat recession with depth (could also be controlled by different
layers if no k decrease is wanted (set this parameter to 1.0)
theta_sat    = 0.46  0.38  0.43  ; # saturated water content (fillable porosity in 1/1)
theta_res    = 0.034  0.078  0.057 ; # residual water content (in 1/1, water content which cannot be
poured by transpiration, only by evaporation)
alpha       = 1.6   3.60  7.20  ; # van Genuchten Parameter Alpha
Par_n       = 1.37  1.56  1.70  ; # van Genuchten Parameter n
Par_tau     = 0.5   0.5   0.5   ; # sog. Mualem-Parameter tau in der van-
Genuchten-Gleichung (dort normalerweise 0.5)
thickness   = 0.1   0.1   0.3333 ; # thickness of each single numerical layer in this horizon in m
layers      = 1     2     59     ; # numerical number of layers in this horizon. The thickness of the
layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
}
121305 SI_SIC_L {method = MultipleHorizons;
FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
which are needed for Topmodel only
GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the
grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-

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63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here
 PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour
 (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
 MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's
 more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
 CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less
 dense. This Factor describes the reduction ratio per meter
 MacroDepth = 1.2 ; # maximum depth of the macropores
 horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the
 horizons shortly in the following row
 Name = SI01m SIC02m L10m ; # short descriptions
 ksat = 6.94e-7 1.94e-7 2.89e-6 ; # saturated hydraulic conductivity in m/s
 k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
 layers if no k decrease is wanted (set this parameter to 1.0
 theta_sat = 0.46 0.46 0.43 ; # saturated water content (fillable porosity in 1/1)
 theta_res = 0.034 0.034 0.078 ; # residual water content (in 1/1, water content which cannot be
 poured by transpiration, only by evaporation)
 alpha = 1.6 1.60 3.60 ; # van Genuchten Parameter Alpha
 Par_n = 1.37 1.37 1.56 ; # van Genuchten Parameter n
 Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
 Genuchten-Gleichung (dort normalerweise 0.5)
 thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
 layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the
 layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
 }
 121308 SI_SIC_C {method = MultipleHorizons;
 FCap = 28.17; mSB = 42.6; ksat_topmodel = 6.94E-7; suction = 426; # optional parameters
 which are needed for Topmodel only
 GrainSizeDist = 0.1 0.5 0.3 0.05 0.03 0.01 0.01; # optional: when using silting up model, the
 grain size fractions for sand, silt, clay, and Stones1..4 must be given here. Stones1 = 2-6.3mm, Stones2=6.3-20mm, Stones3=20-
 63mm, Stones4=63-200mm.; # optional: when using silting up model, the grain size fractions for sand, silt and clay must be given here
 PMacroThresh = 12 ; # precipitation capacity thresholding macropore runoff in mm per hour
 (not in m/s, because it's more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
 MacroCapacity = 3 ; # capacity of the macropores in mm per hour (not in m/s, because it's
 more convenient than to write it down in m/s, e.g. 5mm/h = 1.38e-6)
 CapacityRedu = 0.5 ; # reduction of the macropore capacity with depth -> pores become less
 dense. This Factor describes the reduction ratio per meter
 MacroDepth = 1.2 ; # maximum depth of the macropores
 horizon = 1 2 3 ; # ID of the horizon (must be ascendent) it's recommended to name the
 horizons shortly in the following row
 Name = SI01m SIC02m C10m ; # short descriptions
 ksat = 6.94e-7 1.94e-7 5.56e-7 ; # saturated hydraulic conductivity in m/s
 k_recession = 0.8 0.9 1.0 ; # k sat recession with depth (could also be controlled by different
 layers if no k decrease is wanted (set this parameter to 1.0
 theta_sat = 0.46 0.46 0.38 ; # saturated water content (fillable porosity in 1/1)
 theta_res = 0.034 0.034 0.068 ; # residual water content (in 1/1, water content which cannot be
 poured by transpiration, only by evaporation)
 alpha = 1.6 1.60 0.80 ; # van Genuchten Parameter Alpha
 Par_n = 1.37 1.37 1.09 ; # van Genuchten Parameter n
 Par_tau = 0.5 0.5 0.5 ; # sog. Mualem-Parameter tau in der van-
 Genuchten-Gleichung (dort normalerweise 0.5)
 thickness = 0.1 0.1 0.3333 ; # thickness of each single numerical layer in this horizon in m
 layers = 1 2 59 ; # numerical number of layers in this horizon. The thickness of the
 layer is given by layers x thickness. All profiles must have an identical number of layers (for memory handling reasons only)
 }