SUPPLEMENTARY MATERIAL

This material accompanies "Development and application of SNOSWAB - an online model for daily estimation of snowpack processes, soil water content and soil water budget" manuscript by Serban Danielescu

Table S1. SNOSWAB parameters and coefficients

NAME	DEFINITION	RANGE OF VALUES
SNOW MODULE		
STARTING VALUES		
SNWTinit - Initial snow layer thickness (cm)	Thickness of the snow layer on the first day of the analysis. This is converted into mm for subsequent calculations using 1/CFSmc	≥0
SNWMinit - Initial snowmelt (mm)	Amount of snow melted on the first day of the analysis	≥0
COEFFICIENTS		
THRrs - Air temperature threshold for rain to be accumulated as snow (^{o}C)	Precipitation falling as rain is treated as snow when air temperature is below this threshold. This results in the respective rain amount to be added to the snow layer instead of infiltrating and/or becoming surface runoff	-20 to 10
THRsm - Air temperature threshold for initiating snowmelt (°C)	Precipitation falling as snow is treated as rain when air temperature is above this threshold. In addition, melting of the snow occurs on days with air temperature above this threshold.	-20 to 10
CFTsm - Correction factor - snowmelt due to air temperature (mm)	The amount of snow that is melted for each degree of air temperature above THRsm.	≥0
CFRsm - Correction factor - snowmelt due to rain (mm)	The amount of snow that is melted for each mm of rain that is not accumulated in the snow layer	≥0
CFSmc - Correction factor - snow as mm water to cm snow	Factor for converting calculated snow layer thickness from mm water (as calculated by the model) to cm of snow	≥0
CFets - Correction factor - portion of evapotranspiration occurring in the soil	Factor for estimating the portion of actual evapotranspiration (ET) occuring in the soil. The remainder of ET is considered to occur before water enters the soil (e.g., canopy interception; water ponding at the soil surface, etc.). Due to the model calculations routines and routing of water through various components of the model depending on various model coefficients and calculated soil water content, the final ratio between ET above soil and ET in the soil will be different than the value set via CFets.	0 to 1
WATER BALANCE MODULE		

STARTING VALUES		
SWCinit - Soil water content (SWC) (% of PORe)	SWC on the first day of the analysis. SWCinit cannot be higher than the effective porosity of the layer (PORe)	1 to PORe
SRinit - Surface runoff (mm)	Amount of surface runoff on the first day of the analysis	≥ 0
NGinit - Net SWC gain (mm)	Net gain in SWC on the first day of the analysis	≥ 0
NLinit - Net SWC loss (mm)	Net loss in SWC on the first day of the analysis	≥ 0
LAYER PROPERTIES		
THKN - Layer or root zone thickness (mm)	The thickness of the modelled layer. The layer can be the root zone, a soil horizon or the entire soil profile	≥ 0
PORe - Layer effective porosity (%)	Effective porosity of the layer. This is used for defining the maximum soil water content (SWC)	1 to 100
INFILTRATION COEFFCIENTS		
THRinfLH - SWC threshold for switching between low and high infiltration rate (%)	Infiltration rate is high when soil water content (SWC) is below this threshold and low when SWC is above this threshold	0 to 1
INFlr - Infiltration rate at low SWC (mm/hr)	Infiltration rate when SWC is lower than THRinfLH (i.e., high infiltration rate)	≥ 0
INFhr - Infiltration rate at high SWC (mm/hr)	Infiltration rate when SWC is higher than THRinfLH (i.e., low infiltration rate)	≥ 0
DRAINAGE COEFFICIENTS		
THRdraHL - SWC threshold for switching drainage from high to low rate (% of PORe)	Drainage rate is high when soil water content (SWC) is above this threshold and low when SWC is below this threshold	1 to 100
DRAlr - Drainage rate at low SWC (mm/hr)	Drainage rate when SWC is lower than THRdraHL (i.e., low drainage rate)	≥ 0
DRAhr - Drainage rate at high SWC (mm/hr)	Drainage rate when SWC is higher than THRdraHL (i.e., high drainage rate)	≥ 0
THRswstd - SWC threshold for stopping drainage (% of PORe)	Drainage stops when the SWC is below this threshold. This corresponds to dry soil conditions when drainage is expected to cease	1 to 100
THRtstd - Air temperature threshold for stopping drainage (^{o}C)	Drainage stops when the air temperature is below this threshold. This is considered to be a reasonable proxy for simulating frozen soil conditions. THRtstd is generally lower than the actual soil temperature	-20 to 10
CFeidr - Surface runoff to drainage correction factor – excess infiltration	Forces a portion of surface runoff to be transferred directly to drainage if CFeidr>0. Forces a portion of drainage to be transferred directly to surface runoff if CFeidr<0. Non-zero values for CFeidr do not impact SWC. CFeidr initial value should be set to zero, and should be adjusted only if model calibration using other coefficients does not produce satisfactory results.	-1 to 1

CFosdr - Surface runoff to drainage correction factor – oversaturation	Forces a portion of water from oversaturation (i.e., when Forces a portion of surface runoff to be transferred directly to drainage if CFosdr>0. Forces a portion of drainage to be transferred directly to surface runoff if CFosdr<0. Non-zero values for CFosdr do not impact SWC. CFosdr initial value should be set to zero, and should be adjusted only if model calibration using other coefficients does not produce satisfactory results.	-1 to 1
OTHER COEFFICIENTS		
CFets - Correction factor - portion of evapotranspiration occurring in the soil	Factor for estimating the portion of actual evapotranspiration (ET) that occurs in the soil. The remainder of ET is considered to occur before water enters the soil (e.g., canopy interception; water ponding at the soil surface, etc.). Due to the model calculations routines and routing of water through various components of the model depending on various model coefficients and calculated soil water content, the final ratio between ET above soil and ET in the soil will be different than the value set via CFets.	0 to 1
THRets - SWC threshold for stopping soil evapotranspiration (% of PORe)	Forces evapotranspiration to stop when SWC is below this value.	1 to 100
THRlw - Threshold for low SWC state (% of PORe)	Threshold for considering the soil to be in a low SWC state. This is used only for counting the number of days when the soil is in this SWC state and can be used for example for estimating the number of days that require irrigation or number of days with water deficit.	1 to 100
THRhw - Threshold for high SWC state (% of PORe)	Threshold for considering the soil to be in a high SWC state. This is used only for counting the number of days when the soil is in this SWC state and can be used for example for estimating the number of days with excess water present in the soil.	1 to 100

Table S2. SNOSWAB model equations for the SNOW MODULE[1]

ABBREV.	*NAME*	*EQUATION*
DATE	Date (yyyy-mm-dd)	n.a. [INPUT DATA]
TEMP	Mean air temperature (°C)	n.a. [INPUT DATA]
TOTPP	Total precipitation amount (mm)	n.a. [INPUT DATA]
RAIN	Rain amount (mm)	n.a. [INPUT DATA]
SNOF	Snowfall amount (mm)	=TOTPP-SNOF
RAINS	Rain added to the snow layer (mm)	=IF(TEMP>*THRrs*,0,RAIN)

3

RAINNS	Rain not added to the snow layer (mm)	=RAIN-RAINS
SNOA	Snowfall added to the snow layer (mm)	=IF(TEMP<'$THRsm$, SNOF,0)
SNOM	Snowfall not added to the snow layer (mm)	=SNOF-SNOA
RSSL	Rain and snowfall contributing to snow layer (mm)	=RAINS+SNOA
RSI	Rain and snowfall contributing to infiltration (mm)	=RAINNS+SNOM
SNMT	Potential snowmelt due to temperature (mm)	=IF((AND(TEMP>$THRsm$,$SNTFmm_{i-1}$>0)),CFTsm*(SQRT($TEMP^2$)-SQRT($THRsm^2$)),0) [empirically derived degree-day snowmelt equation]
SNMR	Potential snowmelt due to rain (mm)	=IF(AND($SNTFmm_{i-1}$>0,RAIN>0),RAIN*$CFRsm$,0)
SNTFmm	Snow layer thickness (mm)	=IF($SNTFmm_{i-1}$+RSSL-SNMT-SNMR<0,0, SNTFmm+RSSL-SNMT-SNMR)
SNG	Net snow gain to the snowpack (mm)	=IF($SNTFmm_{i-1}$-SNTFmm>0, $SNTFmm_{i-1}$-SNTFmm>0,0)
SNMF	Net snowmelt from the snowpack (mm)	=IF($SNTFmm_{i-1}$-SNTFmm<0, SNTFmm-$SNTFmm_{i-1}$>0,0)
ETA	Actual evapotranspiration (mm) [Input data]	n.a.
ETasi	Above soil ET (mm) before corrections for dry soil (mm)	=IF(OR(TOTPP>0, SNTFmm>0),ETA-ETA*CFets,0)
ETfsas	ET from soil transferred to ET above soil when soil is dry (mm)	=ETisi-ETcds [calculated in the WATER BALANCE MODULE]
ETasf	Above soil ET after rerouting ET from dry soil (mm)	=ETasi+ETfsas
WATisrf	**Water available for infiltration or surface runoff after ET correction (mm)**	=IF(SNMF+RSI>ETasf, SNMF+RSI-ETasf,0)
SNTFcm	**Snow layer thickness (cm)**	=SNTFmm*CFSmc

Note: [1] The equations are presented using Microsoft Excel® notation convention. The detailed definition of each of the variables in the table is provided in the online user guide available at https://snoswab.hydrotools.tech. Additional notations are provided in brackets. The coefficients and parameters (*italic font*) used in the table are explained in Table S1. The parameters in **bold** font are considered key output parameters. "i" subscript indicates the position in the time series of a variable; "i-1" subscript indicates the day preceding the "i"th day of the timeseries. For the cases, when "i" and/or "i-1"subscripts are not included, the calculations for the respective variable occur on the ith day of the

timeseries. Only the "i-1" subscript is included when the calculation of a variable value for the ith day involves using data from both the i and the i-1 days.

Table S3. SNOSWAB model equations for the WATAER BALANCE MODULE

ABBREV.	NAME	EQUATION
WATisrf	**Water available for infiltration or surface runoff after ET correction (mm)**	=IF(SNMF+RSI>ETasf, SNMF+RSI-ETasf,0) [calculated in the SNOW MODULE]
INFcap	Infiltration capacity (mm)	=IF(SWCfinmm$_{i-1}$<THRinfLH,INFlr*24,INFhr*24)
INFact	**Actual infiltration (mm)**	=IF(WATisrf=0,0,IF(WATisrf<INFcap, WATisrf,INFcap))
DRAcap	Drainage capacity (mm)	=IF(SWCfinmm$_{i-1}$<THRdraHL,DRAlr*24,DRAhr*24)
DRAfre	Drainage with frozen soil conditions (mm)	=IF(TEMP<THRtstd,0,DRAcap)
DRAfin	Drainage with dry soil correction (mm)	=IF(SWCfinmm< THRswsd,0,DRAfre)
DRAbinf	Drainage boost from excess infiltration (mm)	=SReinf* CFeidr
DRAoss	Drainage boost from oversaturated soil (mm)	=SResas*CFosdr
DRAact	**Actual drainage (mm)**	=DRAfin+DRAoss+DRABinf
ETisi	Soil ET (mm) before correction for dry soil	=ETA-ETasi
ETcds	**Soil ET corrected for dry soil (mm)**	=IF(SWCfinmm<THRets,0,ETfsas)
ETfsas	ET from soil transferred to ET above soil when soil is dry (mm)	=ETisi-ETcds
SWCint	Soil water content (mm) - intermediate	=SWCint+INFact-ETcds-DRAfin
SWCfinmm	**Soil water content - corrected for saturated soil (mm)**	=IF(SWCfinmm$_{i-1}$+SWCint-SWCint$_{i-1}$>PORe, PORe, SWCfinmm$_{i-1}$+SWCint-SWCint$_{i-1}$)

SWCfin	**Soil water content - corrected for saturated soil (%)**	$=SWCfinmm/THKN*100$
SReinf	Surface runoff due to excess infiltration (mm)	$=WATisrf-INFact$
SReinfDB	Surface runoff due to excess infiltration after drainage correction (mm)	$=SReinf*(1-CFeidr)$
SResas	Surface runoff due to saturated soil (mm)	$=IF(SWCfinmm<PORe,0,(SWCint-SWCint_{i-1})-(SWCfinmm-SWFCfinmm_{i-1}))$
SResasDB	Surface runoff due to saturated soil after drainage correction (mm)	$=SResas*(1-CFosdr)$
SRTint	Total surface runoff before drainage correction (mm)	$=SReinf+SResas$
SRTact	**Total surface runoff after drainage corrections (mm)**	$=SReinfDB+SReasasDB$
SWCgain	Net SWC gain (mm)	$=IF(SWCfinmm-SWCfinmm_{i-1}>0, SWCfinmm-SWCfinmm_{i-1},0)$
SWCloss	Net SWC loss (mm)	$=IF(SWCfinmm-SWCfinmm_{i-1}<0, -1*(SWCfinmm-SWCfinmm_{i-1}), 0)$
SWClow	**Days with low soil water content**	$=IF(SWCfinmm<THRlw,1,0)$
SWChigh	**Days with high soil water content**	$=IF(SWCfinmm>THRhw,1,0)$

Note: [1] The equations are presented using Microsoft Excel® notation convention. The detailed definition of each of the variables in the table is provided in the online user guide available at https://snoswab.hydrotools.tech. Additional notations are provided in brackets. The coefficients and parameters (*italic font*) used in the table are explained in Table S1. The parameters in **bold** font are considered key output parameters. "i" subscript indicates the position in the time series of a variable; "i-1" subscript indicates the day preceding the "i"th day of the timeseries. For the cases, when "i" and/or "i-1"subscripts are not included, the calculations for the respective variable occur on the ith day of the timeseries. Only the "i-1" subscript is included when the calculation of a variable value for the ith day involves using data from both the i and the i-1 days.

Table S4. Model performance statistics for SNOSWAB calibration and validation[1] simulations

	Snow layer thickness (cm) [SNTFcm]	Soil water content (%) [SWCfin]	Surface runoff (mm) [SRact]	Drainage (mm) [DRAact]
Calendar season				
Average calibration data	7.90 [10.8]	26.8 [27.7]	49.6 [48.3]	134 [133]
Average model output	7.04 [11.4]	27.8 [27.8]	49.6 [41.5]	134 [117]
PBIAS (%)	10.9 [-5.31]	-3.76 [-0.49]	2.15 [14.0]	7.20 [12.5]
NRMSE (%)	9.50 [3.43]	14.6 [8.76]	18.5 [18.0]	16.2 [14.4]
R^2	0.91 [0.99]	0.79 [0.95]	0.49 [0.66]	0.59 [0.68]
Daily "average" year (multi-year averages for each day of the year)				
Average calibration data	8.47 [10.3]	26.6 [27.5]	0.58 [0.56]	1.55 [1.53]
Average model output	7.21 [10.9]	27.7 [27.7]	0.56 [0.48]	1.34 [1.23]
PBIAS (%)	14.9 [-6.21]	-4.03 [-0.54]	2.38 [14.0]	7.08 [12.3]
NRMSE (%)	5.81 [4.70]	13.4 [9.30]	23.3 [26.4]	32.4 [25.0]
R^2	0.97 [0.98]	0.90 [0.89]	0.08 [0.21]	0.15 [0.26]
Monthly "average" year (multi-year averages for each month of the year)				
Average calibration data	8.67 [10.5]	26.6 [27.6]	17.6 [16.9]	47.3 [46.6]
Average model output	7.39 [11.1]	27.7 [27.7]	17.1 [14.5]	43.9 [40.9]
PBIAS (%)	14.8 [-6.27]	-4.00 [-0.52]	2.38 [14.0]	7.08 [12.3]
NRMSE (%)	5.56 [3.99]	14.7 [9.79]	29.8 [18.5]	25.6 [20.5]
R^2	0.99 [1.00]	0.95 [0.93]	0.33 [0.66]	0.45 [0.60]

Note: [1]validation simulation values are shown in brackets

Table S5. Monthly values of key output variables for the SNOW module (2008-2019)[1]

Month	TEMP (°C)	TOTPP (mm)	Rain (mm)	ETA (mm)	Snow (mm)	SNTFmm (mm)	SNTFcm (cm)	SNG (mm)	SNMF (mm)	Etasf (mm)	WATisrf (mm)
Jan-08	-5.5	134.6	56.4	4.4	78.2	75.2	54.1	69.6	101.4	1.3	128.3
Feb-08	-5.7	193.8	97	6.3	96.8	35.7	25.7	84.1	106.8	1.9	181.9
Mar-08	-4.4	110.5	70.9	13.7	39.6	15.3	11.0	45.6	60.8	4.1	122.8
Apr-08	4.1	74.5	49.2	35.3	25.3	0.0	0.0	0.0	10.9	3.1	82.3
May-08	8.8	127.8	127.8	61.6	0.0	0.0	0.0	0.0	0.0	7.6	120.2
Jun-08	15.2	61	61	91.5	0.0	0.0	0.0	0.0	0.0	11.8	51.6
Jul-08	20.8	34.4	34.4	135.5	0.0	0.0	0.0	0.0	0.0	65.9	15.6
Aug-08	18.1	240.2	240.2	102.7	0.0	0.0	0.0	0.0	0.0	24.9	221.7
Sep-08	14.1	156.8	156.8	62.2	0.0	0.0	0.0	0.0	0.0	7.6	150.3
Oct-08	8.3	61.4	61.4	31.6	0.0	0.0	0.0	0.0	0.0	4.4	57.1
Nov-08	4.0	114.4	75.6	12.2	38.8	3.1	2.2	21.4	21.4	2.0	105.0
Dec-08	-2.0	184.6	117.6	4.8	67.0	7.5	5.4	63.6	59.6	1.0	169.9
Jan-09	-9.9	103.2	14	4.5	89.2	63.0	45.3	83.2	9.4	1.4	15.0

7

Feb-09	-5.7	98.4	23	6.4	75.4	105.3	75.8	71.6	34.0	1.9	55.5
Mar-09	-3.8	107.8	53	15.6	54.8	101.5	73.1	48.4	47.7	4.7	48.4
Apr-09	4.0	85.1	73.7	35.4	11.4	13.7	9.9	6.4	122.6	6.8	195.5
May-09	10.1	107.8	107.8	68.6	0.0	0.0	0.0	0.0	0.0	12.7	96.3
Jun-09	15.1	111.6	111.6	95.2	0.0	0.0	0.0	0.0	0.0	9.5	103.3
Jul-09	18.1	126.2	126.2	120.2	0.0	0.0	0.0	0.0	0.0	16.9	111.0
Aug-09	19.2	185.8	185.8	115.4	0.0	0.0	0.0	0.0	0.0	13.0	175.6
Sep-09	13.6	65	65	67.5	0.0	0.0	0.0	0.0	0.0	5.4	59.8
Oct-09	6.9	222.8	211.8	27.9	11.0	0.0	0.0	0.0	0.0	5.4	217.4
Nov-09	4.9	96.5	95.1	13.8	1.4	0.0	0.0	0.0	0.0	1.7	94.8
Dec-09	-2.8	117.4	58.8	4.2	58.6	9.2	6.6	50.7	44.5	1.3	101.3
Jan-10	-4.1	86.6	21.6	4.9	65.0	8.3	6.0	34.2	20.6	1.4	68.4
Feb-10	-3.7	67	14.2	6.7	52.8	43.4	31.3	49.3	21.6	2.0	35.3
Mar-10	0.1	89.4	72.8	18.1	16.6	14.2	10.2	9.4	56.9	4.7	130.3
Apr-10	5.8	53.8	53	38.7	0.8	0.0	0.0	0.0	0.0	4.7	49.4
May-10	9.6	36.6	36.6	68.1	0.0	0.0	0.0	0.0	0.0	10.2	27.1
Jun-10	14.5	162.8	162.8	92.5	0.0	0.0	0.0	0.0	0.0	12.4	152.7
Jul-10	20.1	112.2	112.2	128.3	0.0	0.0	0.0	0.0	0.0	16.8	98.0
Aug-10	18.8	150.2	150.2	117.1	0.0	0.0	0.0	0.0	0.0	15.6	139.8
Sep-10	15.4	117	117	63.7	0.0	0.0	0.0	0.0	0.0	8.5	109.7
Oct-10	8.9	137.4	137.4	32.6	0.0	0.0	0.0	0.0	0.0	4.3	133.1
Nov-10	3.7	171.6	156.8	11.7	14.8	0.8	0.6	9.6	6.4	2.4	166.5
Dec-10	1.4	169.4	130	5.4	39.4	2.7	1.9	23.6	8.3	1.2	152.8
Jan-11	-6.0	109	25.8	4.4	83.2	43.7	31.4	75.7	36.8	1.3	65.8
Feb-11	-6.9	160.8	41.8	6.1	119.0	103.5	74.5	101.8	33.9	1.8	64.0
Mar-11	-2.0	29.8	23	17.5	6.8	60.6	43.6	6.6	113.1	5.2	133.6
Apr-11	4.0	68.2	53.4	34.1	14.8	1.9	1.4	0.0	18.7	5.8	81.3
May-11	9.7	111.4	111.4	61.0	0.0	0.0	0.0	0.0	0.0	8.0	104.2
Jun-11	13.1	50.8	50.8	84.2	0.0	0.0	0.0	0.0	0.0	11.3	41.7
Jul-11	18.4	127.4	127.4	119.4	0.0	0.0	0.0	0.0	0.0	20.0	109.5
Aug-11	18.9	106.4	106.4	111.5	0.0	0.0	0.0	0.0	0.0	12.3	96.0
Sep-11	15.6	28	28	70.9	0.0	0.0	0.0	0.0	0.0	25.3	20.8
Oct-11	10.0	320.6	315.4	32.2	5.2	0.0	0.0	0.0	0.0	6.5	314.1
Nov-11	4.8	126.2	95.4	14.4	30.8	2.0	1.4	21.6	21.6	1.8	124.5
Dec-11	-0.4	131.5	102.2	5.1	29.3	2.6	1.9	25.0	25.0	1.0	115.4
Jan-12	-5.1	77.2	33.4	5.1	43.8	8.1	5.9	54.0	26.8	1.4	48.0
Feb-12	-6.1	123.8	21	7.0	102.8	64.1	46.1	74.0	20.0	2.1	50.2
Mar-12	-0.5	45.7	15.8	20.0	29.9	32.1	23.1	26.9	95.6	4.4	110.4
Apr-12	5.4	94.9	78.9	39.0	16.0	1.9	1.4	10.8	23.3	5.1	103.4
May-12	10.8	65.9	65.9	70.1	0.0	0.0	0.0	0.0	0.0	6.9	59.8
Jun-12	14.3	35.7	35.7	93.5	0.0	0.0	0.0	0.0	0.0	7.1	29.7

Jul-12	19.5	38.8	38.8	136.0	0.0	0.0	0.0	0.0	0.0	110.5	24.0
Aug-12	20.9	65.6	65.6	120.3	0.0	0.0	0.0	0.0	0.0	77.5	46.1
Sep-12	15.8	279.2	279.2	66.7	0.0	0.0	0.0	0.0	0.0	20.9	269.2
Oct-12	10.2	65.6	65.6	33.1	0.0	0.0	0.0	0.0	0.0	4.8	60.9
Nov-12	2.9	62	60.1	12.2	1.9	0.1	0.1	1.9	0.0	2.1	58.1
Dec-12	-1.0	124.2	87	4.5	37.2	0.8	0.6	10.8	6.2	1.2	108.2
Jan-13	-8.0	30.2	7.1	4.4	23.1	14.3	10.3	22.4	28.9	1.3	35.6
Feb-13	-6.1	91.8	39.7	5.9	52.1	15.6	11.2	47.6	35.5	1.7	76.6
Mar-13	-1.3	87.3	42.8	15.6	44.5	11.7	8.4	29.4	15.5	4.5	66.0
Apr-13	3.3	40.7	39.8	32.8	0.9	2.6	1.9	0.5	26.5	5.8	61.2
May-13	10.4	78.8	78.8	64.6	0.0	0.0	0.0	0.0	0.0	9.5	71.7
Jun-13	15.1	87.1	87.1	91.8	0.0	0.0	0.0	0.0	0.0	14.4	75.7
Jul-13	19.7	83.3	83.3	126.9	0.0	0.0	0.0	0.0	0.0	22.6	71.8
Aug-13	18.8	60	60	114.6	0.0	0.0	0.0	0.0	0.0	48.1	46.0
Sep-13	14.8	176.4	176.4	59.0	0.0	0.0	0.0	0.0	0.0	11.0	166.2
Oct-13	8.3	88	88	32.3	0.0	0.0	0.0	0.0	0.0	3.8	84.4
Nov-13	2.2	113	104	10.7	9.0	0.2	0.2	4.2	4.0	1.9	111.3
Dec-13	-6.0	222.2	105.6	3.1	116.6	31.3	22.5	94.2	13.3	0.8	112.1
Jan-14	-6.9	87.8	52.6	4.8	35.2	41.3	29.8	34.0	88.4	1.4	132.6
Feb-14	-7.6	111.8	35.8	6.3	76.0	41.5	29.9	70.8	53.1	1.9	79.3
Mar-14	-6.5	165.5	81.7	13.8	83.8	54.8	39.5	68.0	96.0	4.1	161.2
Apr-14	2.9	134.7	106.1	28.2	28.6	7.0	5.1	24.4	40.8	3.8	146.0
May-14	8.1	80.6	73.4	60.3	7.2	0.0	0.0	0.0	0.0	6.3	74.4
Jun-14	14.3	88	88	93.6	0.0	0.0	0.0	0.0	0.0	9.1	79.6
Jul-14	21.3	45.4	45.2	133.4	0.2	0.0	0.0	0.0	0.0	52.1	26.2
Aug-14	18.2	119	119	106.1	0.0	0.0	0.0	0.0	0.0	35.3	105.3
Sep-14	14.5	112.2	112.2	66.5	0.0	0.0	0.0	0.0	0.0	9.2	103.4
Oct-14	10.6	107.5	107.5	33.7	0.0	0.0	0.0	0.0	0.0	4.1	103.4
Nov-14	2.6	185.5	129.1	10.7	56.4	2.6	1.9	23.8	5.4	2.2	165.4
Dec-14	-0.8	215.9	203.7	4.8	12.2	1.7	1.2	11.6	29.2	1.1	232.7
Jan-15	-8.7	133.4	48.2	4.3	85.2	12.9	9.3	76.5	27.8	1.3	62.0
Feb-15	-12.6	171.8	2.6	4.9	169.2	169.1	121.8	167.9	0.0	1.5	0.0
Mar-15	-6.0	128	4.4	12.4	123.6	278.5	200.6	113.8	12.2	3.7	23.9
Apr-15	0.1	138.2	115.2	24.7	23.0	207.1	149.1	18.0	270.6	7.4	382.8
May-15	10.6	35.6	35.6	70.6	0.0	4.5	3.2	0.0	66.4	8.3	96.1
Jun-15	12.6	129.7	129.7	85.0	0.0	0.0	0.0	0.0	0.0	13.2	118.6
Jul-15	18.0	28.5	28.5	117.0	0.0	0.0	0.0	0.0	0.0	12.2	19.4
Aug-15	21.3	173.6	173.6	121.1	0.0	0.0	0.0	0.0	0.0	76.7	158.9
Sep-15	16.3	58.8	58.8	69.3	0.0	0.0	0.0	0.0	0.0	5.0	54.9
Oct-15	7.8	107.4	104.8	29.8	2.6	0.0	0.0	0.0	0.0	4.6	102.8
Nov-15	4.0	131.3	121.5	11.9	9.8	0.2	0.1	3.4	0.0	1.9	126.1

Dec-15	0.4	165.2	69.8	4.7	95.4	6.5	4.7	60.3	40.5	0.9	133.5
Jan-16	-5.0	63.9	17.6	4.7	46.3	20.4	14.7	45.6	30.7	1.4	46.8
Feb-16	-3.7	94.6	31.2	7.3	63.4	33.2	23.9	53.5	91.6	2.2	117.2
Mar-16	-3.1	90.8	65.5	15.2	25.3	3.4	2.5	20.4	20.4	4.0	71.3
Apr-16	2.2	85	60	32.1	25.0	1.2	0.8	23.2	23.2	4.6	81.8
May-16	9.7	70.5	70.5	63.2	0.0	0.0	0.0	0.0	0.0	10.6	61.2
Jun-16	14.5	64.8	64.8	92.7	0.0	0.0	0.0	0.0	0.0	11.7	56.6
Jul-16	18.9	72	72	122.8	0.0	0.0	0.0	0.0	0.0	36.3	58.7
Aug-16	18.6	120.4	120.4	109.1	0.0	0.0	0.0	0.0	0.0	42.7	104.0
Sep-16	15.2	61.2	61.2	65.0	0.0	0.0	0.0	0.0	0.0	6.3	55.2
Oct-16	9.8	150.2	150.2	33.0	0.0	0.0	0.0	0.0	0.0	5.1	145.3
Nov-16	4.6	117.9	67.7	11.9	50.2	0.4	0.3	5.2	1.6	2.5	111.9
Dec-16	-3.5	104.8	42.6	3.7	62.2	11.7	8.4	52.3	44.4	1.1	93.9
Jan-17	-5.0	110.3	67.8	4.8	42.5	11.4	8.2	36.8	48.3	1.2	107.8
Feb-17	-5.5	113.1	21	6.8	92.1	45.8	33.0	90.8	58.3	2.1	76.3
Mar-17	-4.3	62.8	13.2	15.2	49.6	21.7	15.6	44.1	35.6	4.6	50.1
Apr-17	4.1	41.9	40	34.3	1.9	7.9	5.7	1.6	42.6	5.7	79.0
May-17	9.5	160.4	160.4	62.9	0.0	0.0	0.0	0.0	0.0	11.0	151.1
Jun-17	15.5	85	85	96.0	0.0	0.0	0.0	0.0	0.0	10.7	75.2
Jul-17	18.7	68.8	68.8	129.1	0.0	0.0	0.0	0.0	0.0	10.7	61.4
Aug-17	18.3	127.5	127.5	110.8	0.0	0.0	0.0	0.0	0.0	33.7	117.8
Sep-17	15.4	73.9	73.9	64.9	0.0	0.0	0.0	0.0	0.0	7.3	67.2
Oct-17	11.5	37.8	37.8	36.9	0.0	0.0	0.0	0.0	0.0	4.7	33.7
Nov-17	2.9	111.4	106.9	11.8	4.5	0.1	0.0	1.5	1.5	1.8	109.8
Dec-17	-4.4	100.1	64.1	4.1	36.0	3.1	2.3	29.7	19.6	0.9	72.9
Jan-18	-6.7	72.4	13	4.7	59.4	12.3	8.9	46.9	29.4	1.3	46.1
Feb-18	-4.2	90.4	67	6.6	23.4	7.0	5.1	14.5	41.4	1.5	77.8
Mar-18	-1.4	63.7	39.4	14.3	24.3	3.0	2.2	21.3	22.0	3.3	62.8
Apr-18	3.2	88.9	67.8	32.1	21.1	1.9	1.4	14.8	14.8	5.3	84.5
May-18	9.0	61.7	61.7	68.7	0.0	0.0	0.0	0.0	0.0	7.1	54.6
Jun-18	12.7	155.1	153.5	87.9	1.6	0.0	0.0	0.0	0.0	13.9	143.3
Jul-18	20.9	24.1	24.1	135.2	0.0	0.0	0.0	0.0	0.0	20.6	15.8
Aug-18	20.5	115.7	115.7	114.9	0.0	0.0	0.0	0.0	0.0	29.9	105.2
Sep-18	14.2	93.2	93.2	66.2	0.0	0.0	0.0	0.0	0.0	33.8	83.0
Oct-18	7.1	170.6	170.2	26.8	0.4	0.0	0.0	0.4	0.4	5.6	165.1
Nov-18	0.7	188.8	125.3	9.3	63.5	15.5	11.2	37.7	23.2	1.9	173.1
Dec-18	-4.9	78.8	45.9	3.7	32.9	4.7	3.4	28.2	42.5	1.0	84.3
Jan-19	-6.4	96.7	42.5	4.5	54.2	12.0	8.7	43.8	36.4	1.2	63.7
Feb-19	-8.3	63.5	27	6.1	36.5	7.7	5.5	36.1	30.2	1.7	56.7
Mar-19	-2.4	47.3	24.2	17.5	23.1	14.9	10.7	22.6	36.2	3.6	59.4
Apr-19	3.0	153.4	144	29.7	9.4	0.5	0.3	4.6	4.6	5.4	149.0

May-19	6.7	82.5	81.5	54.1	1.0	0.0	0.0	0.0	0.0	5.8	77.1
Jun-19	14.5	152.1	152.1	93.2	0.0	0.0	0.0	0.0	0.0	12.2	139.9
Jul-19	19.2	34.5	34.5	127.1	0.0	0.0	0.0	0.0	0.0	13.8	27.0
Aug-19	19.5	89.3	89.3	116.9	0.0	0.0	0.0	0.0	0.0	99.2	63.2
Sep-19	13.3	166.5	166.5	60.8	0.0	0.0	0.0	0.0	0.0	7.9	158.6
Oct-19	8.4	117.2	117.2	29.4	0.0	0.0	0.0	0.0	0.0	4.1	113.3
Nov-19	2.0	136.7	117.7	10.6	19.0	0.9	0.6	16.7	6.5	2.5	123.3
Dec-19	-2.6	87.2	60.5	4.2	26.7	5.1	3.7	25.9	16.6	0.8	75.8

Note: [1]TEMP – Mean air temperature; TOTPP - Total precipitation; Rain – rainfall; ETA - Actual evapotranspiration; Snow – snowfall; SNTF - Snow layer thickness; SNG - Net snow gain to the snowpack (mm); SNMF - ; Etasf - Portion of evapotranspiration that occurs above soil; WATisrf - Water available for infiltration or surface runoff.

Table S6. Multi-year monthly averages of key output variables for the SNOW module (2008-2019)[1]

Month	TEMP (°C)	TOTPP (mm)	Rain (mm)	ETA (mm)	Snow (mm)	SNTFmm (mm)	SNTFcm (cm)	SNG (mm)	SNMF (mm)	Etasf (mm)	WATisrf (mm)
Jan	-6.4	92.1	33.3	4.6	58.8	26.9	19.4	51.9	40.4	1.3	68.3
Feb	-6.3	114.3	34.9	6.3	79.3	55.9	40.2	71.2	43.7	1.8	72.3
Mar	-3.0	86.5	42.1	15.7	44.4	51.2	36.9	38.9	51.0	4.2	86.6
Apr	3.5	87.0	72.0	32.9	14.9	20.5	14.8	8.8	49.9	5.3	123.3
May	9.3	85.5	84.8	64.2	0.7	0.4	0.3	0.0	5.5	8.5	83.5
Jun	14.2	99.3	99.1	91.1	0.1	0.0	0.0	0.0	0.0	11.4	89.6
Jul	19.5	66.7	66.7	127.4	0.0	0.0	0.0	0.0	0.0	34.0	52.9
Aug	19.3	128.2	128.2	113.6	0.0	0.0	0.0	0.0	0.0	42.9	113.6
Sep	14.9	114.6	114.6	65.6	0.0	0.0	0.0	0.0	0.0	13.1	107.1
Oct	9.0	133.2	131.6	31.8	1.6	0.0	0.0	0.0	0.0	4.8	128.5
Nov	3.4	129.2	106.1	11.9	23.1	2.1	1.5	12.2	7.5	2.1	121.9
Dec	-2.2	143.3	90.7	4.4	52.7	7.2	5.2	39.4	29.3	1.0	123.0

Note: [1]TEMP – Mean air temperature; TOTPP - Total precipitation; Rain – rainfall; ETA - Actual evapotranspiration; Snow – snowfall; SNTF - Snow layer thickness; SNG - Net snow gain to the snowpack (mm); SNMF - ; Etasf - Portion of evapotranspiration that occurs above soil; WATisrf - Water available for infiltration or surface runoff.

Table S7. Monthly values of key output variables for the WATER BALANCE module (2008-2019)[1]

Month	Etcds (mm)	DRAact (mm)	SWCfinmm (mm)	SWCfin (%)	SRact (mm)	SWClow	SWChigh
Jan-08	3.0	73.0	302.9	30.3	40.9	0.0	25.0
Feb-08	4.4	105.2	306.0	30.6	80.0	0.0	29.0

Mar-08	9.6	82.0	300.5	30.0	46.7	0.0	23.0
Apr-08	32.2	39.5	291.0	29.1	0.0	0.0	7.0
May-08	53.9	61.1	301.8	30.2	9.0	0.0	19.0
Jun-08	79.7	11.4	252.6	25.3	0.0	5.0	0.0
Jul-08	69.6	3.7	206.2	20.6	0.0	27.0	0.0
Aug-08	77.7	31.0	274.9	27.5	10.1	2.0	7.0
Sep-08	54.6	75.4	289.4	28.9	42.2	0.0	11.0
Oct-08	27.2	20.9	279.5	27.9	0.0	0.0	0.0
Nov-08	10.2	51.8	292.9	29.3	14.0	0.0	14.0
Dec-08	3.8	110.4	307.5	30.7	68.4	0.0	31.0
Jan-09	3.2	13.4	299.5	30.0	1.6	0.0	28.0
Feb-09	4.4	33.6	305.9	30.6	5.0	0.0	17.0
Mar-09	10.9	46.5	298.3	29.8	7.7	0.0	17.0
Apr-09	28.6	114.0	298.6	29.9	63.6	0.0	20.0
May-09	55.9	44.0	288.7	28.9	4.4	0.0	7.0
Jun-09	85.7	22.1	265.8	26.6	12.3	0.0	0.0
Jul-09	103.3	3.7	252.1	25.2	0.0	0.0	0.0
Aug-09	102.4	22.4	256.6	25.7	17.1	2.0	1.0
Sep-09	62.1	13.0	266.9	26.7	0.0	0.0	0.0
Oct-09	22.4	112.3	302.6	30.3	64.9	0.0	28.0
Nov-09	12.1	62.6	296.2	29.6	12.2	0.0	14.0
Dec-09	2.9	70.0	306.6	30.7	28.0	0.0	31.0
Jan-10	3.5	50.8	304.7	30.5	15.6	0.0	26.0
Feb-10	4.7	29.2	293.9	29.4	0.0	0.0	12.0
Mar-10	13.3	82.2	301.2	30.1	31.8	0.0	22.0
Apr-10	33.9	39.5	288.5	28.8	0.0	0.0	5.0
May-10	58.0	6.8	261.7	26.2	0.0	0.0	0.0
Jun-10	80.1	39.3	281.8	28.2	17.0	0.0	6.0
Jul-10	111.5	6.8	259.0	25.9	0.0	0.0	0.0
Aug-10	101.4	32.8	223.2	22.3	29.0	21.0	0.0
Sep-10	55.3	6.2	252.7	25.3	1.0	3.0	0.0
Oct-10	28.3	54.8	293.1	29.3	13.7	0.0	14.0
Nov-10	9.3	105.7	304.5	30.4	55.3	0.0	30.0
Dec-10	4.2	86.5	313.8	31.4	35.1	0.0	25.0
Jan-11	3.1	57.4	312.5	31.2	27.2	0.0	31.0
Feb-11	4.3	37.5	297.5	29.7	13.8	0.0	17.0
Mar-11	12.2	90.0	310.3	31.0	43.0	0.0	31.0
Apr-11	28.3	57.3	293.1	29.3	8.5	0.0	9.0
May-11	53.0	57.7	287.9	28.8	19.7	0.0	10.0
Jun-11	72.9	3.6	249.7	25.0	0.0	1.0	0.0
Jul-11	99.4	3.7	219.6	22.0	0.0	26.0	0.0

Aug-11	99.1	5.0	238.1	23.8	1.3	10.0	0.0
Sep-11	45.5	3.6	204.8	20.5	0.0	30.0	0.0
Oct-11	25.8	100.6	293.5	29.3	56.9	0.0	19.0
Nov-11	12.6	88.3	315.9	31.6	37.9	0.0	30.0
Dec-11	4.1	81.0	309.5	30.9	34.0	0.0	31.0
Jan-12	3.7	45.6	303.1	30.3	15.4	0.0	28.0
Feb-12	4.9	30.2	292.8	29.3	3.3	0.0	7.0
Mar-12	15.6	81.5	302.0	30.2	34.4	0.0	24.0
Apr-12	33.9	46.4	285.6	28.6	11.6	0.0	5.0
May-12	63.3	28.7	277.0	27.7	1.6	0.0	4.0
Jun-12	86.4	3.6	231.0	23.1	0.0	15.0	0.0
Jul-12	25.5	3.7	198.0	19.8	0.0	31.0	0.0
Aug-12	42.7	3.7	202.9	20.3	0.0	30.0	0.0
Sep-12	45.8	69.3	268.9	26.9	40.7	5.0	6.0
Oct-12	28.4	50.7	293.2	29.3	3.3	0.0	8.0
Nov-12	10.1	50.2	293.0	29.3	1.4	0.0	10.0
Dec-12	3.4	58.3	309.4	30.9	11.3	0.0	22.0
Jan-13	3.1	32.2	310.3	31.0	10.4	0.0	31.0
Feb-13	4.3	59.7	300.7	30.1	31.1	0.0	21.0
Mar-13	11.1	49.7	303.8	30.4	2.7	0.0	23.0
Apr-13	27.0	49.1	298.2	29.8	0.3	0.0	16.0
May-13	55.1	17.8	274.2	27.4	0.0	0.0	0.0
Jun-13	77.4	16.1	271.4	27.1	0.0	0.0	0.0
Jul-13	104.3	4.4	225.5	22.6	0.6	17.0	0.0
Aug-13	66.5	3.7	206.7	20.7	0.0	31.0	0.0
Sep-13	48.0	29.0	260.3	26.0	11.3	7.0	0.0
Oct-13	28.5	30.2	283.0	28.3	0.0	0.0	3.0
Nov-13	8.8	74.0	303.1	30.3	25.2	0.0	26.0
Dec-13	2.3	74.3	304.7	30.5	44.0	0.0	28.0
Jan-14	3.4	66.5	314.4	31.4	40.0	0.0	22.0
Feb-14	4.4	51.6	312.8	31.3	33.1	0.0	28.0
Mar-14	9.6	90.4	303.5	30.4	63.5	0.0	31.0
Apr-14	24.4	90.5	299.3	29.9	40.1	0.0	24.0
May-14	54.0	41.3	279.5	27.9	15.7	0.0	6.0
Jun-14	84.4	3.6	254.3	25.4	0.0	0.0	0.0
Jul-14	81.3	3.7	212.3	21.2	0.0	23.0	0.0
Aug-14	70.8	3.7	211.7	21.2	0.0	31.0	0.0
Sep-14	57.3	13.7	231.9	23.2	10.1	20.0	0.0
Oct-14	29.6	12.4	265.0	26.5	0.9	0.0	6.0
Nov-14	8.5	100.4	311.2	31.1	51.7	0.0	30.0
Dec-14	3.7	134.9	317.9	31.8	89.6	0.0	31.0

Jan-15	3.0	43.8	311.9	31.2	25.3	0.0	31.0
Feb-15	3.4	6.7	301.8	30.2	0.0	0.0	23.0
Mar-15	8.7	22.3	286.1	28.6	0.0	0.0	0.0
Apr-15	17.3	192.6	306.0	30.6	142.2	0.0	27.0
May-15	62.4	65.6	293.9	29.4	27.6	0.0	15.0
Jun-15	71.8	18.3	266.5	26.6	2.3	0.0	4.0
Jul-15	104.9	5.3	230.0	23.0	0.0	19.0	0.0
Aug-15	44.4	32.6	210.3	21.0	28.9	25.0	0.0
Sep-15	64.2	3.6	239.5	23.9	0.0	7.0	0.0
Oct-15	25.2	22.4	275.4	27.5	0.0	0.0	0.0
Nov-15	10.0	69.6	296.8	29.7	23.9	0.0	9.0
Dec-15	3.8	93.0	310.9	31.1	44.3	0.0	31.0
Jan-16	3.3	40.0	310.4	31.0	4.7	0.0	26.0
Feb-16	5.1	76.4	303.0	30.3	41.1	0.0	29.0
Mar-16	11.2	46.6	292.2	29.2	4.5	0.0	9.0
Apr-16	27.6	66.5	297.9	29.8	17.8	0.0	17.0
May-16	52.7	14.6	274.6	27.5	0.0	0.0	0.0
Jun-16	81.0	11.4	267.5	26.8	0.0	0.0	0.0
Jul-16	86.5	3.7	212.9	21.3	0.0	30.0	0.0
Aug-16	66.4	6.3	219.6	22.0	2.5	17.0	0.0
Sep-16	58.7	3.6	229.1	22.9	0.0	21.0	0.0
Oct-16	28.0	29.7	257.6	25.8	13.5	9.0	3.0
Nov-16	9.4	74.7	298.4	29.8	24.3	0.0	21.0
Dec-16	2.6	66.7	302.7	30.3	29.8	0.0	30.0
Jan-17	3.7	70.1	301.7	30.2	34.8	0.0	31.0
Feb-17	4.8	45.0	291.4	29.1	21.0	0.0	6.0
Mar-17	10.6	50.8	298.6	29.9	13.8	0.0	19.0
Apr-17	28.6	44.9	294.1	29.4	5.4	0.0	13.0
May-17	51.9	67.5	290.8	29.1	27.9	0.0	11.0
Jun-17	85.3	9.8	271.9	27.2	0.0	0.0	0.0
Jul-17	118.4	7.6	229.3	22.9	3.9	17.0	0.0
Aug-17	77.1	3.7	218.4	21.8	0.0	26.0	0.0
Sep-17	57.6	3.6	223.1	22.3	0.0	19.0	0.0
Oct-17	32.2	3.7	236.6	23.7	0.0	4.0	0.0
Nov-17	10.0	33.7	272.8	27.3	9.8	0.0	3.0
Dec-17	3.2	42.1	303.4	30.3	11.8	0.0	26.0
Jan-18	3.4	38.6	303.2	30.3	11.7	0.0	30.0
Feb-18	5.1	61.3	296.5	29.6	24.4	0.0	17.0
Mar-18	11.1	31.5	290.6	29.1	0.1	0.0	10.0
Apr-18	26.9	58.6	298.8	29.9	8.2	0.0	19.0
May-18	61.6	24.0	280.4	28.0	0.0	0.0	4.0

Jun-18	74.0	28.6	282.9	28.3	0.0	0.0	3.0
Jul-18	114.5	11.5	240.8	24.1	0.0	13.0	1.0
Aug-18	85.0	11.7	213.4	21.3	8.0	27.0	0.0
Sep-18	32.4	3.6	206.9	20.7	0.0	27.0	0.0
Oct-18	21.2	61.3	291.2	29.1	23.3	0.0	16.0
Nov-18	7.5	102.2	302.8	30.3	58.5	0.0	28.0
Dec-18	2.7	56.1	307.4	30.7	27.6	0.0	31.0
Jan-19	3.3	48.5	299.6	30.0	23.3	0.0	26.0
Feb-19	4.4	31.0	300.2	30.0	15.9	0.0	21.0
Mar-19	13.9	47.9	298.6	29.9	7.6	0.0	16.0
Apr-19	24.3	83.7	298.3	29.8	33.3	0.0	20.0
May-19	48.4	39.1	290.4	29.0	1.1	0.0	8.0
Jun-19	81.0	47.2	284.7	28.5	7.7	0.0	1.0
Jul-19	113.3	10.0	241.6	24.2	0.0	12.0	0.0
Aug-19	17.7	3.7	200.9	20.1	0.0	28.0	0.0
Sep-19	52.9	34.9	274.9	27.5	14.2	0.0	5.0
Oct-19	25.3	63.7	302.4	30.2	11.6	0.0	20.0
Nov-19	8.1	81.8	307.9	30.8	31.4	0.0	30.0
Dec-19	3.4	71.5	294.4	29.4	29.3	0.0	16.0

Note: [1]Etcds - Portion of evapotranspiration that occurs in the soil; DRAact – Total drainage; SWCfin - Soil water content; SRact - Total surface runoff; SWClow - Number of days with low soil water content; SWChigh – Number of days with high soil water content.

Table S8. Multi-year monthly averages of key output variables for the WATER BALANCE module (2008-2019)[1]

Month	Etcds (mm)	DRAact (mm)	SWCfinmm (mm)	SWCfin (%)	SRact (mm)	SWClow	SWChigh
Jan	3.3	48.3	300.1	30.6	20.9	0.0	27.9
Feb	4.5	47.0	292.7	30.0	22.3	0.0	18.7
Mar	11.4	59.8	291.1	29.9	21.3	0.0	18.9
Apr	27.6	73.7	290.5	29.6	27.6	0.0	15.3
May	55.7	39.2	276.1	28.4	8.9	0.0	7.0
Jun	79.6	18.1	257.5	26.5	3.3	1.7	1.2
Jul	94.8	5.7	220.0	22.8	0.4	17.8	0.1
Aug	71.0	13.2	216.0	22.3	8.1	21.0	0.6
Sep	52.9	20.7	238.5	24.5	9.0	11.6	1.8
Oct	27.0	47.7	272.7	28.1	16.6	1.2	9.8
Nov	9.8	73.8	290.9	30.0	28.0	0.0	20.3
Dec	3.4	79.4	300.0	30.7	38.5	0.0	27.7

Note: [1]Etcds - Portion of evapotranspiration that occurs in the soil; DRAact – Total drainage; SWCfin - Soil water content; SRact - Total surface runoff; SWClow - Number of days with low soil water content; SWChigh – Number of days with high soil water content.