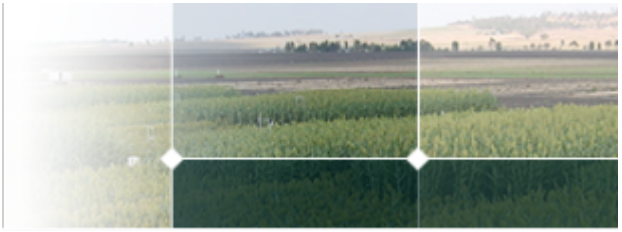

1 Swim

Parameters (Inputs)

Name	Description	Units	Type	Value
A	Tortuosity Constant.		double	0
CN2Bare	Bare soil runoff curve number		double	0
CNCov	Cover for max curve number reduction		double	0.8
CNRed	Max. reduction in curve number due to cover		double	20
Diagnostics	Show diagnostic information?		boolean	False
Dis	Dispersivity.	(cm^2/h)/(cm/h)^p	double	0
Disp	Dispersivity Power.		double	0
DTHC	Tortuoisty Offset.		double	0
DTHP	Tortuoisty Power.		double	0
DTMax	Maximum Timestep.	min	double	1440
DTMin	Minimum Timestep.	min	double	0
eo_durn	Duration of evaporation (min).		double	720

Name	Description	Units	Type	Value
eo_time	Time of evaporation (hh:mm).		String	06:00
KDul	Hydraulic conductivity at DUL	mm/d	double	1
MaxWaterIncrement	Maximum water increment.	mm	double	10
PSIDul	Matric Potential at DUL.	cm	double	-100
Salb	Base soil albedo	0-1	double	0.13
SoluteSpaceWeightingFactor	Solute space weighting factor.		double	0
SpaceWeightingFactor	Space weighting factor.		double	0
VC	Vapour Conductivity Calculations.		boolean	True

Properties (Outputs)

Name	Description	Units	Type	Settable?
ConcWaterCl	Amount of CL not adsorbed (ppm).		double	False
ConcWaterNH4	Amount of NH4 not adsorbed (ppm).		double	False
ConcWaterNO3	Amount of NO3 not adsorbed (ppm).		double	False
ConcWaterUrea	Amount of Urea not adsorbed (ppm).		double	False
CoverSurfaceRunoff	Surface cover effects on runoff curve number reduction.	0-1	double	False
Drainage	Water drainage from bottom of profile	mm	double	False

Name	Description	Units	Type	Settable?
Eo	Potential evapotranspiration of the whole soil-plant system	mm	double	True
Eos	Potential evaporation from soil surface	mm	double	False
Es	Actual (realised) soil water evaporation	mm	double	False
ESW	Extractable soil water relative to LL15	mm	double	False
Flow	Amount of water moving upward from each soil layer during unsaturated flow (negative value means downward movement)	kg/ha	double	False
FlowCl	CL movement out of a layer.		double	False
FlowNH4	NH4 movement out of a layer.		double	False
FlowNO3	NO3 movement out of a layer.		double	False
FlowUrea	NH4 movement out of a layer.		double	False
Flux	Amount of water moving downward out of each soil layer due to gravity drainage (above DUL) (mm)		double	False
Infiltration	Water infiltration (rainfall and irrigation) into the surface layer.	mm	double	False
K	Water potential of layer	cm/h	double	False
LateralOutflow	Amount of water moving laterally out of the profile (mm)		double	False
LeachCl	CL leached from the bottom of the profile.		double	False
LeachNH4	NH4 leached from the bottom of the profile.		double	False

Name	Description	Units	Type	Settable?
LeachNO3	NO3 leached from the bottom of the profile.		double	False
LeachUrea	Urea leached from the bottom of the profile.		double	False
PAW	Plant available water SW-LL15.	mm/mm	double	False
PAWmm	Plant available water SW-LL15.	mm	double	False
Pond	Pond depth.	mm	double	False
PoreInteractionIndex	Pore Interaction Index for shape of the K(theta) curve for soil hydraulic conductivity	-	double	True
PotentialInfiltration	Rainfall less than intercepted by the canopy and residue components (Set by Microclimate).		double	True
PrecipitationInterception	Amount of rainfall intercepted by crop and residue canopies		double	True
PSI	Water potential of layer	cm	double	True
Runoff	Water runoff	mm	double	False
SoluteFlowEfficiency	The efficiency (0-1) that solutes move up with water.		double	True
SoluteFluxEfficiency	The efficiency (0-1) that solutes move down with water.		double	True
SubsurfaceDrain	Subsurface drain.	mm	double	False
SubsurfaceDrainCL	CL movement out of a sub surface drain.		double	False
SubsurfaceDrainNH4	NH4 movement out of a sub surface drain.		double	False
SubsurfaceDrainNO3	NO3 movement out of a sub surface drain.		double	False

Name	Description	Units	Type	Settable?
SubsurfaceDrainUrea	NH4 movement out of a sub surface drain.		double	False
SW	Volumetric water content	mm/mm	double	True
SWmm	Water content	mm	double	False
Theta	Theta	$cm^{3/cm}3$	double	True
Thickness	Soil thickness for each layer (mm)(		double	False
WaterTable	Water table depth (mm)	mm	double	True

Links (Dependencies)

Name	Type	IsOptional?
canopies	ICanopy	False
clock	IClock	False
physical	IPhysical	False
solutes	ISolute	False
subsurfaceDrain	SwimSubsurfaceDrain	True
summary	ISummary	False
surfaceOrganicMatter	ISurfaceOrganicMatter	False
water	Water	False

Methods (callable from manager)

Name	Description
RemoveWater	void RemoveWater(double dlt_sw_dep) *Remove water from the profile*
Reset	void Reset()

Name	Description
SetLowerBCForGivenPotential	void SetLowerBCForGivenPotential(double bbcPotential) *Set the constant potential bottom boundary.*
SetLowerBCForGradient	void SetLowerBCForGradient(double bbcGradient) *Set the lower boundary condition for gradient.*
SetLowerBCForSeepage	void SetLowerBCForSeepage(double bbcPotentialSeepage) *Set the constant potential bottom boundary.*
SetSurfaceBCForCurveNumber	void SetSurfaceBCForCurveNumber()
SetSurfaceBCForPowerFunction	void SetSurfaceBCForPowerFunction(double minimumSurfaceStorage, double maximumSurfaceStorage, double initialSurfaceStorage, double precipitationConstant, double runoffRateFactor, double runoffRatePower) *Runoff calculated by a power function.*
SetTopBCForConductanceFunction	void SetTopBCForConductanceFunction(double minimumConductance, double maximumConductance, double initialConductance, double precipitationConstant) *Set the top boundary condition for conductance function.*
SetTopBCForConstantPotential	void SetTopBCForConstantPotential()
SetTopBCForInfiniteSurfaceConductance	void SetTopBCForInfiniteSurfaceConductance()
SetWaterTable	void SetWaterTable(double InitialDepth) *Sets the water table.*
Standardise	void Standardise(double targetThickness) *Gets the model ready for running in a simulation.*
Sum_Report	void Sum_Report()

Name	Description
Tillage	void Tillage(TillageType Tillage) *Perform tillage*
Tillage	void Tillage(String tillageType) *Perform tillage*

2 Water

This class encapsulates the water content (initial and current) in the simulation.

Properties (Outputs)

Name	Description	Units	Type	Settable?
AllowedRelativeTo	Allowed strings in 'RelativeTo' property.		String	False
Depth	Depth strings. Wrapper around Thickness.	mm	String	True
DepthWetSoil	Calculate the depth of wet soil (mm).		double	True
FilledFromTop	Distribute the water at the top of the profile when setting fraction full.		boolean	True
FractionFull	Calculate the fraction of the profile that is full.		double	True
HydraulicConductivity	Soil hydraulic conductivity (mm/d)	mm/d	double	False
InitialPAWmm	Plant available water (mm).	mm	double	True
InitialValues	Initial water values	mm/mm	double	True
InitialValuesMM	Initial values total mm	mm	double	False
MM	Amount water (mm)	mm	double	False
PAW	Plant available water SW-LL15 (mm/mm).	mm/mm	double	False

Name	Description	Units	Type	Settable?
PAWmm	Plant available water SW-LL15 (mm).	mm	double	False
pF	Soil water potential (kPa)	-	double	False
Physical	Finds the 'Physical' node.		IPhysical	False
Potential	Soil water potential (kPa)	kPa	double	False
RelativeTo	The crop name (or LL15) that fraction full is relative to		String	True
RelativeToLL	Find LL values (mm) for the RelativeTo property.		double	False
Thickness	Thickness		double	True
Volumetric	Amount (mm/mm)	mm/mm	double	True
WaterModel	Finds the 'SoilWater' node.		ISoilWater	False

Events published

Name	Type
WaterChanged	Void WaterChanged (Object sender, EventArgs e)

Methods (callable from manager)

Name	Description
AreInitialValuesWithinPhysicalBoundaries	boolean AreInitialValuesWithinPhysicalBoundaries()
Reset	void Reset()
Standardise	void Standardise(double targetThickness) *Gets the model ready for running in a simulation.*

3 SwimSubsurfaceDrain

SWIM sub surface drain model

Properties (Outputs)

Name	Description	Units	Type	Settable?
DrainDepth	Gets or sets the drain depth.	mm	double	True
DrainRadius	Gets or sets the drain radius.	mm	double	True
DrainSpacing	Gets or sets the drain spacing.	mm	double	True
ImpermDepth	Gets or sets the imperm depth.	mm	double	True
Klat	Gets or sets the klat.	mm/d	double	True

4 TillageType

Tillage type structure

Properties (Outputs)

Name	Description	Units	Type	Settable?
cn_rain	Gets or sets the cn_rain.		int32	True
cn_red	Gets or sets the cn_red.		int32	True
f_incorp	Gets or sets the f_incorp.		double	True
tillage_depth	Gets or sets the tillage_depth.		double	True