Major changes between SWAP 3.2 and SWAP 3.03

No	Description	Input changed?
1	Upgrade of Penman – Monteith calculation procedure	No
2	Adaptation of Astro routine to enable Penman – Monteith calculations north of the polar circle	
3	Handling of detailed rainfall records and detailed rainfall duration records	
4	Evaporation from ponding layer implemented	
5	Introduction of option for checking irrigation criteria at user defined time events. Time events are specified by a fixed interval	
6	Snow / frost descriptions and implementation improved	
7	Interpolation procedure in root extraction routine improved	
8	Possibility to define the bottom boundary condition by a tabulated discharge – groundwater level relationship	Switch SWQHBOT should be specified
9	Handling of a predefined groundwater level time series as bottom boundary condition is more accurately implemented. Mismatch of inserted and used time events solved	No
10	Switch from flux –controlled bottom boundary to free drainage condition in case complete depletion of water storage due to specified inconsistent boundary conditions	
11	Optional implicit treatment of Cauchy bottom boundary condition in numerical solution procedure	SwBotb3Impl
12	Implicit handling of the upper boundary by setting a flux or head controlled upper boundary condition within the iteration – loop; disabling the beforehand estimation of upper boundary flux	No
13	Taking account of interflow volume in upper groundwater system for calculation of lateral drainage sink term	No
14	Introduction of upper boundary for lateral drainage fluxes as a function of drain depth and actual groundwater level	
15	Several changes and bug fixes in Macro – pores option, implicit treatment of matrix – macro pore exchange fluxes in the numerical solution procedure	
16	Introduction of air entry pressure head value and adjustment of water retention curve at near saturation	`h_entry` should be specified
17	User defined method of internodal conductivity calculation	SWKMEAN should be specified
18	Major changes of numerical solution scheme; introduction of Newton – Raphson iteration scheme with back tracking. Replacing the fixed maximum number of iterations by a user defined number. Additional matrix solver implemented for numerical singularity events	MaxIt and MaxBackTr should be defined
19	Bulk density and Freundlich sorption parameters to be specified per natural soil layer	
20	Time control routine improved	
21	Format changes of dwb- wba-, inc-, crp-, drf-, tem-, irg-, snw- and vap-output files	No
22	Version control of source code improved	
23	Standard output of soil physical and soil heat parameters	
24	Output of transpiration stress due to wet, dry, saline or frozen conditions	