REVISON 638

- **variables added to output.sub and ouput.hru file for QTILE/TNO3/TVAP**
- **code for IRES_NUT equations switched**
  - **0 == old equations**
  - **1 == new equations**
- **correction of atmospheric deposition (daily) file read**

REVISION 639

- **BMP additions/changes**
  - **Inputs for sediment/subsurface/tile**
- **Output file added printing elevation bands average temperature (ebandtemp.out)**

NOTE: several revisions skipped due to switching to new subversioning software

REVISION 653

- **output.rch variable for SEDCONC units in the header corrected from 'kg to 'L'**

REVISION 656

- **issue with Auto-FERT phosphorus (in simulating elemental P applications) corrected**
- **corrected a glitch in the BMP code and improved two output files (bmp-sedfil.out/bmp-ri.out)**
  - **so that the shallow aquifer recharge amount into the shallow aquifer of the subbasin**
  - **from the BMP is included in the water balance output.**

REVISION 657

- **issue with average annual atmospheric deposition corrected (divide by zero problem)**

REVISION 658

- **LID (Low Impact Development – urban) additional code added (YoungGu)**
- **output.std header for sediment was changed from 'mm' to 't/ha'**

REVISION 659

- **code for SOL_P_MODEL corrected**
  - **0 = original; 1= new equations (Mike White);**

REVISION 660

- **added two input variables to .hru file**
  - **Iwetgw**
  - **Iwetfile**
- **correction to daily output.hru file when ICALEN == 1;**

REVISION 662

- **minor change in sub-daily precipitation computation**

REVISION 663

- **Minor BMP changes (Jaehak)**

REVISION 664

Summary of changes from Revision 665 – 685 in SWAT2012 model:

REV665
● Zeroed' j' and 'cmup' variables for carbon calculation fixes
● Added SUB and HRU to 'output.swr' file

REV666
● Sub-daily tweaks

REV667
● Added title line to do loop to APEX input file read

REV668
● Added CO2_X2 and CO2_X inputs to basins.bsn file;

REV669
● Double precision added to calculations in all routines (for Phil Gassman/Todd Campbell)
● Atmospheric deposition file read for:
case(0) – Annual
case(1) – Monthly
both changed to free format;

REV670
● Edited septic storage calculations
● Declared LMF and LSF variables

Revision 671
- Calculation for SDRAIN variable coded if zeroed in sdrain input file, assumes the basins.bsn input value for all HRU's

Revision 675
- output.sed – corrected degradation output (that was previously consistent zeroes)

Revision 680
- Changes made in code to make the watout.dat and output.rch files directly comparable (in reference to NYSKIP

Revision 681
- Extended solar, wind and relative humidity to 1900 total gages in one file; (previously 1800)

Rev 682:
- drains.f – recalculation of pot_vol variable
- Fixed headers in output.hru that didn't have underscore;
- New output file named weather_day.out that writes solar, windspeed, rel hum (writes on daily timestep only);
- Extended relative humidity gages from 1800 to 1900;

- Renamed output.pst to output.pes;
- Extended output files that write HRU# from i4 to i6;

Rev 683:
- main.f – revison number and date change;

- allocate_parms.f90 -
    1) extended atmospheric deposition monthly variable from 50 year limit to 100;
    2) added sub_tilep allocation;

The following routines were edited to add TILEP and SUB_TILEP to existing equations for outputting mineral (soluble) P.

- modparm.f - tilep and sub_tilep added;
- routunit.f - added tilep to output equation;
- sim_initday.f - zeroed two variables tilep and sub_tilep
- solp.f - new variable tilep calculation;
- virtual.f - added sub_tilep to output equation;

Rev 684:
main.f

- Revision number and date change;

- Added the current working directory (for Chris George) to print to the command prompt screen at simulation time;

- Updated LID code (Jaehak); only involves source code and not the input/output interfaces;

hruyr.f
- added spaces between some of the variables for the yearly values in the output.hru;

readhru.f
- added statements after the reading of POT_FR FLD_FR and RIP_FR input variables to set them == 1.0 if they are > 1.0 (Srin);

readpnd.f
- added statements after the reading of SPNDFR and SWETFR inputs variables to set them == 1.0 if they are > 1.0 (Srin);

rtout.f
- added statement to set CHLORA == 0.0 if it is < 1.e-6;
- added statements to set VAROUTE(13) - (Chlorophyll-A) to 0.0 if < 1.e-6 and to 1.e6 if > 1.e6 (Srin);

Rev 685:
- main.f - changed revision and date

- some routines changed for checking minimum days between irrigation autoirr.f/allocate_parms.f/modparm.f/sched_mgt.f/subbasin.f

- hruyr.f formatting changed for Jaclyn in output.hru file

- pothole.f changes to this routine where it computes total delivery ratio for pot_sed

- rchaa.f/rchmon.f/rchmon.f changed the if statements for checking for ISPROJ == 3 to produce an output.rch file for Srini

- std2.f/stdaa.f both of these routines were changed for Jaclyn with spacing issues in the output.std file;

Rev 686:

recnst.f/recday.f/recmon.f/recyear.f - Jaehak made edits to each of these routines to correct a problem that was found in subdaily simulation where point source input flow of average flow was not added in an hourly timestep simulation. The point source flow values are now added to the streamflow and show up in the 'output.rch' file correctly.

Rev 687:

- BASINS.BSN file – Added SALT_NUM input to the bottom of the file

- .RTE files:
  - Added HRU_SALT (Monthly adjustment factors for HRU salt loadings) at the bottom of the file;
  - Added SALT_DEL (Salt delivery ratio in reach after HRU_SALT inputs;
  - Added temp constant coef for the following:

```
!tmp_win1/tmpwin2 == temp constant/coef for winter months (Dec-Feb)
!tmp_spr1/tmpspr2 == temp constant/coef for spring months (Jun-Aug)
!tmp_sum1/tmpsum2 == temp constant/coef for summer months (Mar-May)
!tmp_fal1/tmpfal2 == temp constant/coef for fall months (Sep-Nov)
```

- .OPS files:
  - added case (11) to include Generic Salt concentration loadings from the HRU through various pathways such as:
    - Surface runoff salt concentration
    - Subsurface-lateral flow salt concentration
    - Groundwater flow salt concentration
    - Tile flow salt concentration

- Output.rch
  - Added outputs for SALT1-SALT10, SAR and EC after the last column (WTMPdegc);

Rev 688:

FIG.FIG file: RECDAY command, added a code to read SALT1-SALT10 (if ==1);

Rev 689:

This version contains changes in the tropical growth code including:

- MGT_SCHED.F - mgtop 18 added 18 == monsoon planting for tropical growth
- 19 added 19 == reset phenology during monsoon season for tropical perennial growth

-- Auto irrigation problem resolved

-- main.f - revision and date change

Tropical growth routines:
allocate_parms.f
modparm.f
readfcst.f
readsub.f
readwgn.f
sched_mgt.f
subbasin.f

auto irrigatioin:
autoirr.f

Rev 690:

This revision contains all the suggestions made by Doctor Fortran when it was discovered that the debug and release outputs were not matching. The main culprit was with the EXPO function, which was deleted and recoded with the EXP function.

The following routines were edited to replace the 'expo' function with 'exp':

alph.f
eiusle.f
etact.f
pgenhr.f
pkq.f

COMMAND.F – the input variable added in basins.bsn file for Srini's simulation to read in a previous run that SAVEed daily output in the fig.fig file. The input code variable name is ISUB_SAV and if == 0, the model executes the subbasin command in fig.fig. If SUB_SAV == 1, it does not.

HRUALLO.F – extended the number of management operations in the *.mgt file from 1000 to 2000;

MODPARM.F – addeid ISUB_SAV as integer; deleted the function expo source code;

READBSN.F – added the read for the new input variable in 'basins.bsn' file named ISUB_SAV; default = 0;

READFIG.F edited to be able to have unlimited SAVE commands in the fig.fig file; NOTE: the unit numbers had to be changed to prevent from affecting other files;

SAVE.F - edit for unlimited number of SAVE commands in fig.fig; previous limit was 10 commands;

VIRTUAL.F – changed all AMAX1 To MAX in this routine;

Rev 691:

MAIN.F – date of version edited;

SUBBASIN.F – change of computing the PET_DAY/PPET variable;

SURFACE.F – correction in the argument in the following line; "k" should have been "kk";

```
if (hrnopcp(sb,kk) > 96) then ! four days
```

Rev 692:

The following routines were changed to fix the rooting depth issues that was found in HAWQS simulations.

PLANTOP.F/READSOL.F/SWU.F

ROUTRES.F – misspelled word in commented line of code;