SWAT

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Contents

Chapter 1

SWAT

An updated SWAT 2012 revision 670 code

Objectives

- Standard indentation and translation to Fortran 90 by using `findent`. See the translate-fortran90.pl perl script file (:heavy_check_mark:)
- Exhaustive use of the "implicit none" directive to detect bad variable usage (:heavy_check_mark:)
- Generate a GNU `Make` makefile and compile with GNU `GFortran`. See the gernerate-makefile.pl perl script file (:heavy_check_mark:)
- Remove non-used variables and format labels (:heavy_check_mark:)
- Detect and solve all uninitialized variables (:heavy_check_mark: :construction:, some proposed solutions could be incorrect)
- Remove unneeded variable initializations (:heavy_check_mark:) as:

```
j=0 !  this line is not necessary
j=ihru
```

- Remove redundant code (:heavy_check_mark:)
- Exhaustive use of the "parameter" directive on constants (:heavy_check_mark:)
- Generate a detailed list of issues detected in the original code (:heavy_check_mark:, see at the end of this README)
- Remove obsolete commented code (:x:)
- Update variable descriptions in comments (:x:)
- Standardize comments by using Doxygen style on order to generate documentation (:construction:, a lot of work)

Required tools

- `GFortran` (to compile the source code)
- `Make` (to build the executable file)
- `Perl` (optional: to execute the perl scripts to update the makefile or to translate original files to Fortran 90)
- `Findent` (optional: to translate original files to Fortran 90 with a standard indentation)
- On Microsoft Windows systems you have to install `MSYS2` and the required utilities (`GFortran` and `Make`). You can follow detailed instructions in `install-unix`

Instructions to generate Fortran 90 style code from original code

In order to generate Fortran 90 style code with standard indentation from original code you have to type on a UNIX type terminal (you need Perl and Findent):

```
$ perl translate-fortran90.pl
```

Instructions to generate an initial GNU make Makefile

Type on the UNIX type terminal, when translated the original code to Fortran 90 style (you need Perl):

```
$ perl generate-makefile.pl
```

Instructions to generate an executable to test

Type on the UNIX type terminal (you need GFortran and Make)

- In UNIX type operative systems:

  ```
  $ make
  ```

- In a MSYS2 terminal in Microsoft Windows:

  ```
  $ EXE=".exe" LDFLAGS="-static" make
  ```

- Cross-compiling a 32 bits Microsoft Windows executable in a UNIX type operative system:

  ```
  $ prefix="i686-w64-mingw32-" EXE=".exe" LDFLAGS="-static" make
  ```

- Cross-compiling a 64 bits Microsoft Windows executable in a UNIX type operative system:

  ```
  $ prefix="x86\_64-w64-mingw32-" EXE=".exe" LDFLAGS="-static" make
  ```

Instructions to generate an optimized executable file

Type on the UNIX type terminal (you need GFortran and Make)

- In UNIX type operative systems:

  ```
  $ CFLAGS="-march=native -flto" LDFLAGS="-flto" make strip
  ```

- In a MSYS2 terminal in Microsoft Windows:

  ```
  $ EXE=".exe" CFLAGS="-flto" LDFLAGS="-flto -static" make strip
  ```

- Cross-compiling a 32 bits Microsoft Windows executable in a UNIX type operative system:

  ```
  $ prefix="i686-w64-mingw32-" EXE=".exe" CFLAGS="-flto" LDFLAGS="-flto -static" make strip
  ```

- Cross-compiling a 64 bits Microsoft Windows executable in a UNIX type operative system:

  ```
  $ prefix="x86\_64-w64-mingw32-" EXE=".exe" CFLAGS="-flto" LDFLAGS="-flto -static" make strip
  ```

Issues in the original source code

This is a list of possible issues detected in the original source code. These issues have been mostly detected by the GFortran (to compile the source code) compiler warnings. Some of them could not arise because the logic of the variables is not possible.

- In biofilm.f:
  - "dcoef" is not defined. `dcoef=3` as in watqual.f? Then, I propose at beginning: `real*8, parameter :: dcoef = 3.`
- In bmp_ri_pond.f:
  - "qseep" and "qet" could be used not initialized at lines 133 and 134. However the problem only arises for `nstep<1`
- In bmp_sand_filter.f:
  - "sed_removed" at line 342 could be used not initialized if `sfsedstdev<=0`
- In bpm_sed_pond.f:
  - `bmp_sed _pond` seems to be `bmp_sed_pond` at line 186
- In bmp_wet_pond.f:
  - "hvol" could be used not initialized in "ext_dpth" subroutine at line 267 in first bucle iteration
- In clicon.f:
  - "tmxbsb", "tmnbsb", "rbsb", "rstpbsb", "rhdbsb", "rabsb", "rmxbsb", "daylbsb", "fradbsb" and "u10bsb" could be used not initialized at 186-207 lines
- In conapply.f:
  - "k" and "kk" could be used not initialized at 121-122 lines if `iday_pest(j)/=ipst_freq(j)` and `curyr>nyskip`
- In confert.f:
  - "ifrt" seems to be "it" at line 214
- In curno.f:
  - "smxold" could be used not initialized if `cn1(h)<=1.e-6` and `curyr/=0` at line 96
- In drains.f:
  - "nlayer" could be used not initialized at line 23. However, the problem only arises if it is not set in the previous bucle (`mlyr<=1` or `sol_z(j1,j)<=0`)
- In etact.f:
  - "sev" could be used not initialized at line 286 if `dep>=esd` and `ly==2`
- In filter.f:
  - "remove21" seems to be "remove2" at line 316
- In grass_wway.f:
  - "sf_depth" and "sf_sed" could be used not initialized at lines 133 and 137 if `sf_area>0` and `sf_area<=1.e-6`
- In hhnoqual.f:
  - "algon" seems to be "algcon" at line 190

- In hhwatqual.f
  - "orgnpin" seems to be "orgpin" at line 278
  - `thour=1.0` at line 377 overwrites previous "thour" calculation. It is wrong
- In hmeas.f:
  - "rhdbsb" could be used not initialized at line 84
- In killop.f:
  - "ff1" and "ff2" are not defined at lines 167 and 267. They are set in harvkillop.f file (lines 257-258). They have to be included in modparm.f to share harvkillop.f values? or they have to be redefined as in harvkillop.f?
- In NCsed_leach.f90:
  - "perc_clyr" could be used not initialized at line 221 if `sol_nly(j)<2`
- In nrain.f:
  - "no2pcp" seems to be "no3pcp" at line 72
- In pmeas.f:
  - "rbsb" could be used not initialized at line 143
  - "flag" could be used not initialized if 'a==' `at line 210`
  - `"rainsb" could be used not initialized, however only if`nstep<=0'
- In pminrl2.f:
  - at line 95 a comma is necessary between "base" and "vara"
  - "ssp" could be used not initialized at line 196 if `xx<=1.e-6`
- In pothole.f:
  - "solp_tileo" could be used not initialized at line 593 if `pot_vol(j)<=1.e-6` or `potvol_↩ tile<=1.e-6`
- In potholehr.f:
  - "potflow" seems to be "potflwo" at line 447
- In readatmodep.f:
  - `momax=12*nbyr` is defined at line 65 but not used. It has to be "mo_max"? but then, it overwrites the file read
- In readops.f:
  - `year = 0.` seems to be `iyear = 0` at line 98
  - "mg13" seems to be "mgt13" at line 206
- In readpnd.f:
  - "vselsetlpnd" seems to be "velsetlpnd" at line 279
- In readru.f:
  - "tck" is used but not initialized at line 79
- In readsepticbz.f:
  - at line 135 `4.  e-8` seems to be `4.e-8`
- In rewind_init.f:

  - "orig_tnylda" is used but not initialized at line 174

- In routels.f:
  - "dstor" is used but not initialized at line 134. It has to be calculated as in watbal.f? or as in the commented line 109?
  - "latqout" and "gwqout" could be used not initialized at lines 142-143

- In rtbact.f:
  - "netwtr" could be used not initialized at line 124, however only if `nstep<1`

- In rthpest.f:
  - `thour=1.0` at line 183 overwrites previous "thour" calculation. It is wrong
  - "frsol" and "frsrb" could be used not initialized at lines 289-290 if `hrtwtr(ii)>0.001` and `hrtwtr(ii)/(idt*60)<=0.01`

- In rtpest.f:
  - `tday=1.0` at line 180 overwrites previous "tday" calculation. It is wrong

- In sched_mgt.f:
  - < = seems to be <= at 202 line
  - "husc" and "igrow" at lines 264-265 are used but not initialized. "husc" has to be `phu_op(iop,ihru)` has in readmgt.f? "igrow" has to be `igro(ihru)` has in readmgt.f?

- In smeas.f:
  - "rabsb" could be used not initialized at line 86

- In sweep.f:
  - "fr_curb" is used but not initialized at line 56. It has to be added to modparm.f to share result with sched_mgt.f? or it has to be `mgt5op(nop(ihru),ihru)` as in sched_mgt.f?

- In tmeas.f:
  - "tmxbsb" and "tmnbsb" could be used not initialized at lines 109-110

- In transfer.f:
  - "ratio", "xx" and "ratio1" could be used not initialized at lines 236, 239 and 241 if `ihout==2`

- In wmeas.f:
  - "u10bsb" could be used not initialized at line 85

- In zero0.f:
  - "sol_sumn03" seems to be "sol_sumno3" at line 508

- In zero_urbn.f:
  - "stp_stagdis" seems to be "dtp_stagdis" at line 84
  - "subdr_kg" seems to be "subdr_km" at line 149
  - "spl_eros" is not defined at line 21, it could be "eros_spl"?

Chapter 2

Modules Index

2.1 Modules List

Here is a list of all documented modules with brief descriptions:

Chapter 3

Data Type Index

3.1 Data Types List

Here are the data types with brief descriptions:

Chapter 4

File Index

4.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 5

Module Documentation

5.1 parm Module Reference

main module contatining the global variables

Data Types

- interface ascrv
- interface atri
- interface aunif
- interface dstn1
- interface ee
- interface expo
- interface fcgd
- interface HQDAV
- interface layersplit
- interface ndenit
- interface qman
- interface regres
- interface rsedaa
- interface tair
- interface theta
- interface vbl

Variables

- integer **icalen**
- real ∗8 **prf_bsn**
- real ∗8 **co2_x2**
- real ∗8 **co2_x**
- real ∗8, dimension(:), allocatable **alph_e**
- real ∗8, dimension(:), allocatable **co_p**
- real ∗8, dimension(:), allocatable **surlag**
- real ∗8, dimension(:), allocatable **cdn**
- real ∗8, dimension(:), allocatable **nperco**
- real ∗8, dimension(:), allocatable **cmn**

- real ∗8, dimension(:), allocatable **phoskd**
- real ∗8, dimension(:), allocatable **psp**
- real ∗8, dimension(:), allocatable **sdnco**
- real ∗8 **yield**
- real ∗8 **burn_frlb**
- real ∗8 **pst_kg**
- real ∗8 **r2adj_bsn**
- real ∗8 **yieldgrn**
- real ∗8 **yieldbms**
- real ∗8 **yieldtbr**
- real ∗8 **yieldn**
- real ∗8 **yieldp**
- real ∗8 **hi_bms**
- real ∗8 **hi_rsd**
- real ∗8 **yieldrsd**
- real ∗8, dimension(:), allocatable **l_k1**
- real ∗8, dimension(:), allocatable **l_k2**
- real ∗8, dimension(:), allocatable **l_lambda**
- real ∗8, dimension(:), allocatable **l_beta**
- real ∗8, dimension(:), allocatable **l_gama**
- real ∗8, dimension(:), allocatable **l_harea**
- real ∗8, dimension(:), allocatable **l_vleng**
- real ∗8, dimension(:), allocatable **l_vslope**
- real ∗8, dimension(:), allocatable **l_ktc**
- real ∗8, dimension(:), allocatable **biofilm_mumax**
- real ∗8, dimension(:), allocatable **biofilm_kinv**
- real ∗8, dimension(:), allocatable **biofilm_klw**
- real ∗8, dimension(:), allocatable **biofilm_kla**
- real ∗8, dimension(:), allocatable **biofilm_cdet**
- real ∗8, dimension(:), allocatable **biofilm_bm**
- real ∗8, dimension(:,:), allocatable **hru_rufr**
- real ∗8, dimension(:,:), allocatable **daru_km**
- real ∗8, dimension(:,:), allocatable **ru_k**
- real ∗8, dimension(:,:), allocatable **ru_c**
- real ∗8, dimension(:,:), allocatable **ru_eiq**
- real ∗8, dimension(:,:), allocatable **ru_ovsl**
- real ∗8, dimension(:,:), allocatable **ru_a**
- real ∗8, dimension(:,:), allocatable **ru_ovs**
- real ∗8, dimension(:,:), allocatable **ru_ktc**
- real ∗8, dimension(:), allocatable **gwq_ru**
- real ∗8, dimension(:), allocatable **qdayout**
- integer, dimension(:), allocatable **ils2**
- integer, dimension(:), allocatable **ils2flag**
- integer **iru**
- integer **mru**
- integer **irch**
- integer **isub**
- integer **idum**
- integer **mhyd_bsn**
- integer **ipest**
- integer **ils_nofig**
- integer **mhru1**
- integer, dimension(:), allocatable **mhyd1**
- integer, dimension(:), allocatable **irtun**
- real ∗8 **wshd_sepno3**

- real ∗8 **wshd_sepnh3**
- real ∗8 **wshd_seporgn**
- real ∗8 **wshd_sepfon**
- real ∗8 **wshd_seporgp**
- real ∗8 **wshd_sepfop**
- real ∗8 **wshd_sepsolp**
- real ∗8 **wshd_sepbod**
- real ∗8 **wshd_sepmm**
- integer, dimension(:), allocatable **isep_hru**
- real ∗8 **fixco**
- real ∗8 **nfixmx**
- real ∗8 **rsd_covco**
- real ∗8 **vcrit**
- real ∗8 **res_stlr_co**
- real ∗8 **wshd_sw**
- real ∗8 **wshd_snob**
- real ∗8 **wshd_pndfr**
- real ∗8 **wshd_pndv**
- real ∗8 **wshd_pndsed**
- real ∗8 **wshd_wetfr**
- real ∗8 **wshd_resfr**
- real ∗8 **wshd_resha**
- real ∗8 **wshd_pndha**
- real ∗8 **percop**
- real ∗8 **wshd_fminp**
- real ∗8 **wshd_ftotn**
- real ∗8 **wshd_fnh3**
- real ∗8 **wshd_fno3**
- real ∗8 **wshd_forgn**
- real ∗8 **wshd_forgp**
- real ∗8 **wshd_ftotp**
- real ∗8 **wshd_yldn**
- real ∗8 **wshd_yldp**
- real ∗8 **wshd_fixn**
- real ∗8 **wshd_pup**
- real ∗8 **wshd_wstrs**
- real ∗8 **wshd_nstrs**
- real ∗8 **wshd_pstrs**
- real ∗8 **wshd_tstrs**
- real ∗8 **wshd_astrs**
- real ∗8 **wshd_hmn**
- real ∗8 **wshd_rwn**
- real ∗8 **wshd_hmp**
- real ∗8 **wshd_rmn**
- real ∗8 **wshd_dnit**
- real ∗8 **ffcb**
- real ∗8 **wshd_rmp**
- real ∗8 **wshd_voln**
- real ∗8 **wshd_nitn**
- real ∗8 **wshd_pas**
- real ∗8 **wshd_pal**
- real ∗8 **wdpq**
- real ∗8 **wshd_plch**
- real ∗8 **wshd_raino3**
- real ∗8 **ressedc**

- real ∗8 **basno3f**
- real ∗8 **basorgnf**
- real ∗8 **wof_p**
- real ∗8 **wshd_pinlet**
- real ∗8 **wshd_ptile**
- real ∗8 **basminpf**
- real ∗8 **basorgpf**
- real ∗8 **sftmp**
- real ∗8 **smtmp**
- real ∗8 **smfmx**
- real ∗8 **smfmn**
- real ∗8 **wgpq**
- real ∗8 **wshd_resv**
- real ∗8 **wshd_ressed**
- real ∗8 **basno3i**
- real ∗8 **basorgni**
- real ∗8 **basminpi**
- real ∗8 **wdlpq**
- real ∗8 **basorgpi**
- real ∗8 **peakr**
- real ∗8 **pndsedin**
- real ∗8 **sw_excess**
- real ∗8 **albday**
- real ∗8 **wglpq**
- real ∗8 **wdps**
- real ∗8 **wtabelo**
- real ∗8 **timp**
- real ∗8 **tilep**
- real ∗8 **wt_shall**
- real ∗8 **sq_rto**
- real ∗8 **tloss**
- real ∗8 **inflpcp**
- real ∗8 **snomlt**
- real ∗8 **snofall**
- real ∗8 **fixn**
- real ∗8 **qtile**
- real ∗8 **crk**
- real ∗8 **latlyr**
- real ∗8 **pndloss**
- real ∗8 **wetloss**
- real ∗8 **potloss**
- real ∗8 **lpndloss**
- real ∗8 **lwetloss**
- real ∗8 **sedrch**
- real ∗8 **fertn**
- real ∗8 **sol_rd**
- real ∗8 **cfertn**
- real ∗8 **cfertp**
- real ∗8 **sepday**
- real ∗8 **bioday**
- real ∗8 **sepcrk**
- real ∗8 **sepcrktot**
- real ∗8 **fertno3**
- real ∗8 **fertnh3**
- real ∗8 **fertorgn**

- real ∗8 **fertsolp**
- real ∗8 **fertorgp**
- real ∗8 **fertp**
- real ∗8 **grazn**
- real ∗8 **grazp**
- real ∗8 **soxy**
- real ∗8 **qdfr**
- real ∗8 **sdti**
- real ∗8 **rtwtr**
- real ∗8 **ressa**
- real ∗8 **wgps**
- real ∗8 **rttime**
- real ∗8 **rchdep**
- real ∗8 **rtevp**
- real ∗8 **rttlc**
- real ∗8 **da_km**
- real ∗8 **resflwi**
- real ∗8 **wdlps**
- real ∗8 **wglps**
- real ∗8 **resflwo**
- real ∗8 **respcp**
- real ∗8 **resev**
- real ∗8 **ressep**
- real ∗8 **ressedi**
- real ∗8 **ressedo**
- real ∗8 **dtot**
- real ∗8 **wdprch**
- real ∗8 **nperco_bsn**
- real ∗8 **pperco_bsn**
- real ∗8 **rsdco**
- real ∗8 **phoskd_bsn**
- real ∗8 **voltot**
- real ∗8 **volcrmin**
- real ∗8 **msk_x**
- real ∗8 **uno3d**
- real ∗8 **canev**
- real ∗8 **usle**
- real ∗8 **rcn**
- real ∗8 **surlag_bsn**
- real ∗8 **bactkdq**
- real ∗8 **precipday**
- real ∗8 **wdpf**
- real ∗8 **thbact**
- real ∗8 **wpq20**
- real ∗8 **wlpq20**
- real ∗8 **wps20**
- real ∗8 **wlps20**
- real ∗8 **bactrop**
- real ∗8 **bactsedp**
- real ∗8 **bactlchp**
- real ∗8 **bactlchlp**
- real ∗8 **enratio**
- real ∗8 **wetpcp**
- real ∗8 **pndpcp**
- real ∗8 **wetsep**

- real ∗8 **wgpf**
- real ∗8 **pndsep**
- real ∗8 **wetev**
- real ∗8 **pndev**
- real ∗8 **pndsedo**
- real ∗8 **wetsedo**
- real ∗8 **pndflwi**
- real ∗8 **wetflwi**
- real ∗8 **pndflwo**
- real ∗8 **wetflwo**
- real ∗8 **wetsedi**
- real ∗8 **da_ha**
- real ∗8 **vpd**
- real ∗8 **bactrolp**
- real ∗8 **bactsedlp**
- real ∗8 **evrch**
- real ∗8 **evlai**
- real ∗8 **pet_day**
- real ∗8 **ep_day**
- real ∗8 **wdlpf**
- real ∗8 **snoev**
- real ∗8 **sno3up**
- real ∗8 **adj_pkr**
- real ∗8 **n_updis**
- real ∗8 **p_updis**
- real ∗8 **nactfr**
- real ∗8 **reactw**
- real ∗8 **sdiegropq**
- real ∗8 **sdiegrolpq**
- real ∗8 **sdiegrops**
- real ∗8 **sdiegrolps**
- real ∗8 **es_day**
- real ∗8 **sbactrop**
- real ∗8 **sbactrolp**
- real ∗8 **sbactsedp**
- real ∗8 **sbactsedlp**
- real ∗8 **ep_max**
- real ∗8 **wof_lp**
- real ∗8 **sbactlchp**
- real ∗8 **sbactlchlp**
- real ∗8 **psp_bsn**
- real ∗8 **rchwtr**
- real ∗8 **resuspst**
- real ∗8 **setlpst**
- real ∗8 **bsprev**
- real ∗8 **bssprev**
- real ∗8 **spadyo**
- real ∗8 **spadyev**
- real ∗8 **spadysp**
- real ∗8 **spadyrfv**
- real ∗8 **spadyosp**
- real ∗8 **qday**
- real ∗8 **usle_ei**
- real ∗8 **al5**
- real ∗8 **pndsedc**

- real ∗8 **no3pcp**
- real ∗8 **rcharea**
- real ∗8 **volatpst**
- real ∗8 **wetsedc**
- real ∗8 **uobw**
- real ∗8 **ubw**
- real ∗8 **uobn**
- real ∗8 **uobp**
- real ∗8 **respesti**
- real ∗8 **wglpf**
- real ∗8 **snocovmx**
- real ∗8 **snocov1**
- real ∗8 **snocov2**
- real ∗8 **rexp**
- real ∗8 **rcor**
- real ∗8 **lyrtile**
- real ∗8 **lyrtilex**
- real ∗8 **ai0**
- real ∗8 **ai1**
- real ∗8 **ai2**
- real ∗8 **ai3**
- real ∗8 **ai4**
- real ∗8 **ai5**
- real ∗8 **ai6**
- real ∗8 **rhoq**
- real ∗8 **tfact**
- real ∗8 **sno50cov**
- real ∗8 **mumax**
- real ∗8 **lambda0**
- real ∗8 **lambda1**
- real ∗8 **lambda2**
- real ∗8 **k_l**
- real ∗8 **k_n**
- real ∗8 **k_p**
- real ∗8 **p_n**
- real ∗8 **rnum1**
- real ∗8 **autop**
- real ∗8 **auton**
- real ∗8 **etday**
- real ∗8 **hmntl**
- real ∗8 **rwntl**
- real ∗8 **hmptl**
- real ∗8 **rmn2tl**
- real ∗8 **rmptl**
- real ∗8 **wdntl**
- real ∗8 **cmn_bsn**
- real ∗8 **rmp1tl**
- real ∗8 **roctl**
- real ∗8 **gwseep**
- real ∗8 **revapday**
- real ∗8 **reswtr**
- real ∗8 **bury**
- real ∗8 **difus**
- real ∗8 **reactb**
- real ∗8 **solpesto**

- real ∗8 **petmeas**
- real ∗8 **wdlprch**
- real ∗8 **wdpres**
- real ∗8 **sorpesto**
- real ∗8 **spcon_bsn**
- real ∗8 **spexp_bsn**
- real ∗8 **solpesti**
- real ∗8 **sorpesti**
- real ∗8 **wdlpres**
- real ∗8 **snoprev**
- real ∗8 **swprev**
- real ∗8 **shallstp**
- real ∗8 **deepstp**
- real ∗8 **msk_co1**
- real ∗8 **msk_co2**
- real ∗8 **ressolpo**
- real ∗8 **resorgno**
- real ∗8 **resorgpo**
- real ∗8 **resno3o**
- real ∗8 **reschlao**
- real ∗8 **resno2o**
- real ∗8 **resnh3o**
- real ∗8 **qdbank**
- real ∗8 **potpcpmm**
- real ∗8 **potevmm**
- real ∗8 **potsepmm**
- real ∗8 **potflwo**
- real ∗8 **potsedo**
- real ∗8 **pest_sol**
- real ∗8 **trnsrch**
- real ∗8 **wp20p_plt**
- real ∗8 **bactminp**
- real ∗8 **bactminlp**
- real ∗8 **wp20lp_plt**
- real ∗8 **cncoef**
- real ∗8 **cdn_bsn**
- real ∗8 **sdnco_bsn**
- real ∗8 **bact_swf**
- real ∗8 **bactmx**
- real ∗8 **bactmin**
- real ∗8 **chla_subco**
- real ∗8 **tb_adj**
- real ∗8 **cn_froz**
- real ∗8 **dorm_hr**
- real ∗8 **smxco**
- real ∗8 **depimp_bsn**
- real ∗8 **ddrain_bsn**
- real ∗8 **tdrain_bsn**
- real ∗8 **gdrain_bsn**
- real ∗8 **rch_san**
- real ∗8 **rch_sil**
- real ∗8 **rch_cla**
- real ∗8 **rch_sag**
- real ∗8 **rch_lag**
- real ∗8 **rch_gra**

- real ∗8 **hlife_ngw_bsn**
- real ∗8 **ch_opco_bsn**
- real ∗8 **ch_onco_bsn**
- real ∗8 **bc1_bsn**
- real ∗8 **bc2_bsn**
- real ∗8 **bc3_bsn**
- real ∗8 **bc4_bsn**
- real ∗8 **rcn_sub_bsn**
- real ∗8 **decr_min**
- real ∗8 **anion_excl_bsn**
- real ∗8, dimension(:), allocatable **wat_tbl**
- real ∗8, dimension(:), allocatable **sol_swpwt**
- real ∗8, dimension(:,:), allocatable **vwt**
- real ∗8 **re_bsn**
- real ∗8 **sdrain_bsn**
- real ∗8 **sstmaxd_bsn**
- real ∗8 **drain_co_bsn**
- real ∗8 **pc_bsn**
- real ∗8 **latksatf_bsn**
- integer **i_subhw**
- integer **imgt**
- integer **idlast**
- integer **iwtr**
- integer **ifrttyp**
- integer **mo_atmo**
- integer **mo_atmo1**
- integer **ifirstatmo**
- integer **iyr_atmo**
- integer **iyr_atmo1**
- integer **matmo**
- integer **mrg**
- integer **mch**
- integer **mcr**
- integer **mpdb**
- integer **mcrdb**
- integer **mfdb**
- integer **mhru**
- integer **mhyd**
- integer **mfcst**
- integer **mnr**
- integer **myr**
- integer **mcut**
- integer **mgr**
- integer **msubo**
- integer **mrcho**
- integer **isubwq**
- integer **ffcst**
- integer isproj

  special project code: 1 test rewind (run simulation twice)
- integer **nhru**
- integer **mo**
- integer **nbyr**
- integer **immo**
- integer **nrch**

- integer **nres**
- integer **irte**
- integer **i_mo**
- integer **icode**
- integer **ihout**
- integer **inum1**
- integer **inum2**
- integer **inum3**
- integer **inum4**
- integer **wndsim**
- integer **ihru**
- integer **inum5**
- integer **inum6**
- integer **inum7**
- integer **inum8**
- integer **icfac**
- integer **nrgage**
- integer **ntgage**
- integer **nrgfil**
- integer **ntgfil**
- integer **nrtot**
- integer **nttot**
- integer **mrech**
- integer **lao**
- integer **igropt**
- integer **npmx**
- integer **irtpest**
- integer **curyr**
- integer **tmpsim**
- integer **icrk**
- integer **iihru**
- integer **ismax**
- integer **itdrn**
- integer **iwtdn**
- integer **iroutunit**
- integer **ires_nut**
- integer **mtil**
- integer **mvaro**
- integer **mrecd**
- integer **idist**
- integer **mudb**
- integer **mrecm**
- integer **mrecc**
- integer **iclb**
- integer **mrecy**
- integer **ipet**
- integer **nyskip**
- integer **ideg**
- integer **ievent**
- integer **slrsim**
- integer **iopera**
- integer **id1**
- integer **idaf**
- integer **idal**
- integer **leapyr**

- integer **mo_chk**
- integer **rhsim**
- integer **mstdo**
- integer **ifirsts**
- integer **ifirsth**
- integer **ifirstw**
- integer **nstot**
- integer **nhtot**
- integer **nwtot**
- integer **icst**
- integer **ilog**
- integer **i**
- integer **iyr**
- integer **itotr**
- integer **iwq**
- integer **iskip**
- integer **scenario**
- integer **ifirstpet**
- integer **itotb**
- integer **itots**
- integer **iprp**
- integer **pcpsim**
- integer **itoth**
- integer **nd_30**
- integer **iops**
- integer **iphr**
- integer **isto**
- integer **isol**
- integer **iscen**
- integer **fcstyr**
- integer **fcstday**
- integer **fcstcycles**
- integer **subtot**
- integer **ogen**
- integer **msub**
- integer **mhruo**
- integer **mres**
- integer **mapp**
- integer **mpst**
- integer **mlyr**
- integer **igen**
- integer **iprint**
- integer **iida**
- integer **fcstcnt**
- integer **icn**
- integer **ised_det**
- integer **mtran**
- integer **idtill**
- integer **motot**
- integer, dimension(100) **ida_lup**
- integer, dimension(100) **iyr_lup**
- integer **no_lup**
- integer **no_up**
- integer **nostep**
- character(len=8) date

date simulation is performed where leftmost eight characters are set to a value of yyyymmdd, where yyyy is the year, mm is the month and dd is the day

- character(len=10) time

  time simulation is performed where leftmost ten characters are set to a value of hhmmss.sss, where hh is the hour, mm is the minutes and ss.sss is the seconds and milliseconds

- character(len=5) **zone**
- character(len=80) prog

  SWAT program header string.

- character(len=13) **slrfile**
- character(len=13) **wndfile**
- character(len=13) **rhfile**
- character(len=13) **petfile**
- character(len=13) **calfile**
- character(len=13) **atmofile**
- character(len=13) **lucfile**
- character(len=13) **septdb**
- character(len=13) **dpd_file**
- character(len=13) **wpd_file**
- character(len=13) **rib_file**
- character(len=13) **sfb_file**
- character(len=13) **lid_file**
- integer, dimension(:), allocatable **ifirstr**
- integer, dimension(:), allocatable **idg**
- integer, dimension(:), allocatable **ifirsthr**
- integer, dimension(:), allocatable values

  values(1): year simulation is performed
  values(2): month simulation is performed
  values(3): day in month simulation is performed
  values(4): time difference with respect to Coordinated Universal Time (ie Greenwich Mean Time)
  values(5): hour simulation is performed
  values(6): minute simulation is performed
  values(7): second simulation is performed
  values(8): millisecond simulation is performed

- integer, dimension(:), allocatable **ndays**
- integer, dimension(:), allocatable **ndays_noleap**
- integer, dimension(:), allocatable **ndays_leap**
- integer **mapex**
- real ∗8, dimension(:), allocatable **flodaya**
- real ∗8, dimension(:), allocatable **seddaya**
- real ∗8, dimension(:), allocatable **orgndaya**
- real ∗8, dimension(:), allocatable **orgpdaya**
- real ∗8, dimension(:), allocatable **no3daya**
- real ∗8, dimension(:), allocatable **minpdaya**
- real ∗8, dimension(:), allocatable **hi_targ**
- real ∗8, dimension(:), allocatable **bio_targ**
- real ∗8, dimension(:), allocatable **tnyld**
- integer, dimension(:), allocatable **idapa**
- integer, dimension(:), allocatable **iypa**
- integer, dimension(:), allocatable **ifirsta**
- integer, dimension(:), allocatable **mo_transb**
- integer, dimension(:), allocatable **mo_transe**
- integer, dimension(:), allocatable **ih_tran**
- integer **msdb**
- integer **iseptic**
- real ∗8, dimension(:), allocatable **sptqs**

- real ∗8, dimension(:), allocatable **percp**
- real ∗8, dimension(:), allocatable **sptbodconcs**
- real ∗8, dimension(:), allocatable **spttssconcs**
- real ∗8, dimension(:), allocatable **spttnconcs**
- real ∗8, dimension(:), allocatable **sptnh4concs**
- real ∗8, dimension(:), allocatable **sptno3concs**
- real ∗8, dimension(:), allocatable **sptno2concs**
- real ∗8, dimension(:), allocatable **sptorgnconcs**
- real ∗8, dimension(:), allocatable **spttpconcs**
- real ∗8, dimension(:), allocatable **sptminps**
- real ∗8, dimension(:), allocatable **sptorgps**
- real ∗8, dimension(:), allocatable **sptfcolis**
- real ∗8, dimension(:), allocatable **failyr**
- real ∗8, dimension(:), allocatable **qstemm**
- real ∗8, dimension(:), allocatable **bio_amn**
- real ∗8, dimension(:), allocatable **bio_bod**
- real ∗8, dimension(:), allocatable **biom**
- real ∗8, dimension(:), allocatable **rbiom**
- real ∗8, dimension(:), allocatable **fcoli**
- real ∗8, dimension(:), allocatable **bio_ntr**
- real ∗8, dimension(:), allocatable **bz_perc**
- real ∗8, dimension(:), allocatable **plqm**
- real ∗8, dimension(:), allocatable **sep_cap**
- real ∗8, dimension(:), allocatable **bz_area**
- real ∗8, dimension(:), allocatable **bz_z**
- real ∗8, dimension(:), allocatable **bz_thk**
- real ∗8, dimension(:), allocatable **bio_bd**
- real ∗8, dimension(:), allocatable **cmup_kgh**
- real ∗8, dimension(:), allocatable **cmtot_kgh**
- real ∗8, dimension(:), allocatable **coeff_bod_dc**
- real ∗8, dimension(:), allocatable **coeff_bod_conv**
- real ∗8, dimension(:), allocatable **coeff_fc1**
- real ∗8, dimension(:), allocatable **coeff_fc2**
- real ∗8, dimension(:), allocatable **coeff_fecal**
- real ∗8, dimension(:), allocatable **coeff_plq**
- real ∗8, dimension(:), allocatable **coeff_mrt**
- real ∗8, dimension(:), allocatable **coeff_rsp**
- real ∗8, dimension(:), allocatable **coeff_slg1**
- real ∗8, dimension(:), allocatable **coeff_slg2**
- real ∗8, dimension(:), allocatable **coeff_nitr**
- real ∗8, dimension(:), allocatable **coeff_denitr**
- real ∗8, dimension(:), allocatable **coeff_pdistrb**
- real ∗8, dimension(:), allocatable **coeff_solpslp**
- real ∗8, dimension(:), allocatable **coeff_solpintc**
- real ∗8, dimension(:), allocatable **coeff_psorpmax**
- integer, dimension(:), allocatable **i_sep**
- integer, dimension(:), allocatable **isep_typ**
- integer, dimension(:), allocatable **isep_opt**
- integer, dimension(:), allocatable **sep_tsincefail**
- integer, dimension(:), allocatable **isep_tfail**
- integer, dimension(:), allocatable **isep_iyr**
- integer, dimension(:), allocatable **sep_strm_dist**
- integer, dimension(:), allocatable **sep_den**
- real ∗8, dimension(:), allocatable **sol_sumno3**
- real ∗8, dimension(:), allocatable **sol_sumsolp**

- real ∗8, dimension(:), allocatable **strsw_sum**
- real ∗8, dimension(:), allocatable **strstmp_sum**
- real ∗8, dimension(:), allocatable **strsn_sum**
- real ∗8, dimension(:), allocatable **strsp_sum**
- real ∗8, dimension(:), allocatable **strsa_sum**
- real ∗8, dimension(:), allocatable **spill_hru**
- real ∗8, dimension(:), allocatable **tile_out**
- real ∗8, dimension(:), allocatable **hru_in**
- real ∗8, dimension(:), allocatable **spill_precip**
- real ∗8, dimension(:), allocatable **pot_seep**
- real ∗8, dimension(:), allocatable **pot_evap**
- real ∗8, dimension(:), allocatable **pot_sedin**
- real ∗8, dimension(:), allocatable **pot_solp**
- real ∗8, dimension(:), allocatable **pot_solpi**
- real ∗8, dimension(:), allocatable **pot_orgp**
- real ∗8, dimension(:), allocatable **pot_orgpi**
- real ∗8, dimension(:), allocatable **pot_orgn**
- real ∗8, dimension(:), allocatable **pot_orgni**
- real ∗8, dimension(:), allocatable **pot_mps**
- real ∗8, dimension(:), allocatable **pot_mpsi**
- real ∗8, dimension(:), allocatable **pot_mpa**
- real ∗8, dimension(:), allocatable **pot_mpai**
- real ∗8, dimension(:), allocatable **pot_no3i**
- real ∗8, dimension(:), allocatable **precip_in**
- real ∗8, dimension(:), allocatable **tile_sedo**
- real ∗8, dimension(:), allocatable **tile_no3o**
- real ∗8, dimension(:), allocatable **tile_solpo**
- real ∗8, dimension(:), allocatable **tile_orgno**
- real ∗8, dimension(:), allocatable **tile_orgpo**
- real ∗8, dimension(:), allocatable **tile_minpso**
- real ∗8, dimension(:), allocatable **tile_minpao**
- integer **ia_b**
- integer **ihumus**
- integer **itemp**
- integer **isnow**
- integer, dimension(:), allocatable **icolb**
- integer, dimension(:), allocatable **icolr**
- integer, dimension(:), allocatable **icolrsv**
- integer, dimension(:), allocatable **icols**
- integer, dimension(:), allocatable **ipdvar**
- integer, dimension(:), allocatable **ipdvab**
- integer, dimension(:), allocatable **ipdvas**
- integer, dimension(:), allocatable **ipdhru**
- real ∗8, dimension(:), allocatable **wshddayo**
- real ∗8, dimension(:), allocatable **wshdmono**
- real ∗8, dimension(:), allocatable **wshdyro**
- real ∗8, dimension(:), allocatable **wshdaao**
- real ∗8, dimension(:), allocatable **fcstaao**
- real ∗8, dimension(:,:), allocatable **wpstdayo**
- real ∗8, dimension(:,:), allocatable **wpstmono**
- real ∗8, dimension(:,:), allocatable **wpstyro**
- real ∗8, dimension(:,:), allocatable **yldkg**
- real ∗8, dimension(:,:), allocatable **bio_hv**
- real ∗8, dimension(:,:), allocatable **wpstaao**
- real ∗8, dimension(:,:), allocatable **rchmono**

- real ∗8, dimension(:,:), allocatable **rchyro**
- real ∗8, dimension(:,:), allocatable **rchaao**
- real ∗8, dimension(:,:), allocatable **rchdy**
- real ∗8, dimension(:,:), allocatable **hrumono**
- real ∗8, dimension(:,:), allocatable **hruyro**
- real ∗8, dimension(:,:), allocatable **hruaao**
- real ∗8, dimension(:,:), allocatable **submono**
- real ∗8, dimension(:,:), allocatable **subyro**
- real ∗8, dimension(:,:), allocatable **subaao**
- real ∗8, dimension(:,:), allocatable **resoutm**
- real ∗8, dimension(:,:), allocatable **resouty**
- real ∗8, dimension(:,:), allocatable **resouta**
- real ∗8, dimension(:,:), allocatable **wshd_aamon**
- real ∗8, dimension(:,:), allocatable **wtrmon**
- real ∗8, dimension(:,:), allocatable **wtryr**
- real ∗8, dimension(:,:), allocatable **wtraa**
- real ∗8, dimension(:,:), allocatable **sub_smfmx**
- real ∗8, dimension(:,:), allocatable **sub_smfmn**
- real ∗8, dimension(:,:,:), allocatable **hrupstd**
- real ∗8, dimension(:,:,:), allocatable **hrupsta**
- real ∗8, dimension(:,:,:), allocatable **hrupstm**
- real ∗8, dimension(:,:,:), allocatable **hrupsty**
- integer, dimension(:), allocatable **ifirstt**
- integer, dimension(:), allocatable **ifirstpcp**
- integer, dimension(:), allocatable **elevp**
- integer, dimension(:), allocatable **elevt**
- real ∗8, dimension(:,:), allocatable **ftmpstdmn**
- real ∗8, dimension(:,:), allocatable **ftmpmn**
- real ∗8, dimension(:,:), allocatable **ftmpmx**
- real ∗8, dimension(:,:), allocatable **ftmpstdmx**
- real ∗8, dimension(:,:,:), allocatable **fpr_w**
- real ∗8, dimension(:,:,:), allocatable **fpcp_stat**
- real ∗8, dimension(:), allocatable **flwin**
- real ∗8, dimension(:), allocatable **flwout**
- real ∗8, dimension(:), allocatable **bankst**
- real ∗8, dimension(:), allocatable **ch_wi**
- real ∗8, dimension(:), allocatable **ch_d**
- real ∗8, dimension(:), allocatable **ch_onco**
- real ∗8, dimension(:), allocatable **ch_opco**
- real ∗8, dimension(:), allocatable **ch_orgn**
- real ∗8, dimension(:), allocatable **ch_orgp**
- real ∗8, dimension(:), allocatable **drift**
- real ∗8, dimension(:), allocatable **rch_dox**
- real ∗8, dimension(:), allocatable **rch_bactp**
- real ∗8, dimension(:), allocatable **alpha_bnk**
- real ∗8, dimension(:), allocatable **alpha_bnke**
- real ∗8, dimension(:), allocatable **disolvp**
- real ∗8, dimension(:), allocatable **algae**
- real ∗8, dimension(:), allocatable **sedst**
- real ∗8, dimension(:), allocatable **rchstor**
- real ∗8, dimension(:), allocatable **organicn**
- real ∗8, dimension(:), allocatable **organicp**
- real ∗8, dimension(:), allocatable **chlora**
- real ∗8, dimension(:), allocatable **nitraten**
- real ∗8, dimension(:), allocatable **nitriten**

- real ∗8, dimension(:), allocatable **ch_li**
- real ∗8, dimension(:), allocatable **ch_si**
- real ∗8, dimension(:), allocatable **ch_bnk_san**
- real ∗8, dimension(:), allocatable **ch_bnk_sil**
- real ∗8, dimension(:), allocatable **ch_bnk_cla**
- real ∗8, dimension(:), allocatable **ch_bnk_gra**
- real ∗8, dimension(:), allocatable **ch_bed_san**
- real ∗8, dimension(:), allocatable **ch_bed_sil**
- real ∗8, dimension(:), allocatable **ch_bed_cla**
- real ∗8, dimension(:), allocatable **ch_bed_gra**
- real ∗8, dimension(:), allocatable **depfp**
- real ∗8, dimension(:), allocatable **depsanfp**
- real ∗8, dimension(:), allocatable **depsilfp**
- real ∗8, dimension(:), allocatable **depclafp**
- real ∗8, dimension(:), allocatable **depsagfp**
- real ∗8, dimension(:), allocatable **deplagfp**
- real ∗8, dimension(:), allocatable **depch**
- real ∗8, dimension(:), allocatable **depsanch**
- real ∗8, dimension(:), allocatable **depsilch**
- real ∗8, dimension(:), allocatable **depclach**
- real ∗8, dimension(:), allocatable **depsagch**
- real ∗8, dimension(:), allocatable **deplagch**
- real ∗8, dimension(:), allocatable **depgrach**
- real ∗8, dimension(:), allocatable **depgrafp**
- real ∗8, dimension(:), allocatable **grast**
- real ∗8, dimension(:), allocatable **depprch**
- real ∗8, dimension(:), allocatable **depprfp**
- real ∗8, dimension(:), allocatable **prf**
- real ∗8, dimension(:), allocatable **r2adj**
- real ∗8, dimension(:), allocatable **spcon**
- real ∗8, dimension(:), allocatable **spexp**
- real ∗8, dimension(:), allocatable **sanst**
- real ∗8, dimension(:), allocatable **silst**
- real ∗8, dimension(:), allocatable **clast**
- real ∗8, dimension(:), allocatable **sagst**
- real ∗8, dimension(:), allocatable **lagst**
- real ∗8, dimension(:), allocatable **pot_san**
- real ∗8, dimension(:), allocatable **pot_sil**
- real ∗8, dimension(:), allocatable **pot_cla**
- real ∗8, dimension(:), allocatable **pot_sag**
- real ∗8, dimension(:), allocatable **pot_lag**
- real ∗8, dimension(:), allocatable **potsani**
- real ∗8, dimension(:), allocatable **potsili**
- real ∗8, dimension(:), allocatable **potclai**
- real ∗8, dimension(:), allocatable **potsagi**
- real ∗8, dimension(:), allocatable **potlagi**
- real ∗8, dimension(:), allocatable **sanyld**
- real ∗8, dimension(:), allocatable **silyld**
- real ∗8, dimension(:), allocatable **clayld**
- real ∗8, dimension(:), allocatable **sagyld**
- real ∗8, dimension(:), allocatable **lagyld**
- real ∗8, dimension(:), allocatable **grayld**
- real ∗8, dimension(:), allocatable **res_san**
- real ∗8, dimension(:), allocatable **res_sil**
- real ∗8, dimension(:), allocatable **res_cla**

- real ∗8, dimension(:), allocatable **res_sag**
- real ∗8, dimension(:), allocatable **res_lag**
- real ∗8, dimension(:), allocatable **res_gra**
- real ∗8, dimension(:), allocatable **pnd_san**
- real ∗8, dimension(:), allocatable **pnd_sil**
- real ∗8, dimension(:), allocatable **pnd_cla**
- real ∗8, dimension(:), allocatable **pnd_sag**
- real ∗8, dimension(:), allocatable **pnd_lag**
- real ∗8, dimension(:), allocatable **wet_san**
- real ∗8, dimension(:), allocatable **wet_sil**
- real ∗8, dimension(:), allocatable **wet_cla**
- real ∗8, dimension(:), allocatable **wet_lag**
- real ∗8, dimension(:), allocatable **wet_sag**
- real ∗8 **ressano**
- real ∗8 **ressilo**
- real ∗8 **resclao**
- real ∗8 **ressago**
- real ∗8 **reslago**
- real ∗8 **resgrao**
- real ∗8 **ressani**
- real ∗8 **ressili**
- real ∗8 **resclai**
- real ∗8 **ressagi**
- real ∗8 **reslagi**
- real ∗8 **resgrai**
- real ∗8 **potsano**
- real ∗8 **potsilo**
- real ∗8 **potclao**
- real ∗8 **potsago**
- real ∗8 **potlago**
- real ∗8 **pndsanin**
- real ∗8 **pndsilin**
- real ∗8 **pndclain**
- real ∗8 **pndsagin**
- real ∗8 **pndlagin**
- real ∗8 **pndsano**
- real ∗8 **pndsilo**
- real ∗8 **pndclao**
- real ∗8 **pndsago**
- real ∗8 **pndlago**
- real ∗8, dimension(:), allocatable **ch_di**
- real ∗8, dimension(:), allocatable **ch_erod**
- real ∗8, dimension(:), allocatable **ch_l2**
- real ∗8, dimension(:), allocatable **ch_cov**
- real ∗8, dimension(:), allocatable **ch_cov1**
- real ∗8, dimension(:), allocatable **ch_cov2**
- real ∗8, dimension(:), allocatable **ch_bnk_bd**
- real ∗8, dimension(:), allocatable **ch_bed_bd**
- real ∗8, dimension(:), allocatable **ch_bnk_kd**
- real ∗8, dimension(:), allocatable **ch_bed_kd**
- real ∗8, dimension(:), allocatable **ch_bnk_d50**
- real ∗8, dimension(:), allocatable **ch_bed_d50**
- real ∗8, dimension(:), allocatable **tc_bed**
- real ∗8, dimension(:), allocatable **tc_bnk**
- integer, dimension(:), allocatable **ch_eqn**

- real ∗8, dimension(:), allocatable **chpst_conc**
- real ∗8, dimension(:), allocatable **chpst_rea**
- real ∗8, dimension(:), allocatable **chpst_vol**
- real ∗8, dimension(:), allocatable **chpst_koc**
- real ∗8, dimension(:), allocatable **chpst_stl**
- real ∗8, dimension(:), allocatable **chpst_rsp**
- real ∗8, dimension(:), allocatable **chpst_mix**
- real ∗8, dimension(:), allocatable **sedpst_conc**
- real ∗8, dimension(:), allocatable **ch_wdr**
- real ∗8, dimension(:), allocatable **sedpst_rea**
- real ∗8, dimension(:), allocatable **sedpst_bry**
- real ∗8, dimension(:), allocatable **sedpst_act**
- real ∗8, dimension(:), allocatable **rch_cbod**
- real ∗8, dimension(:), allocatable **rch_bactlp**
- real ∗8, dimension(:), allocatable **chside**
- real ∗8, dimension(:), allocatable **rs1**
- real ∗8, dimension(:), allocatable **rs2**
- real ∗8, dimension(:), allocatable **rs3**
- real ∗8, dimension(:), allocatable **rs4**
- real ∗8, dimension(:), allocatable **rs5**
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- real ∗8, dimension(:), allocatable **foc_m**
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- real ∗8, dimension(:), allocatable **rcss**
- real ∗8, dimension(:), allocatable **qcap**
- real ∗8, dimension(:), allocatable **chxa**
- real ∗8, dimension(:), allocatable **chxp**
- real ∗8, dimension(:,:,:), allocatable **qhy**
- real ∗8 **ff1**
- real ∗8 **ff2**

5.1.1 Detailed Description

main module contatining the global variables

Author

modified by Javier Burguete Tolosa

Chapter 6

Data Type Documentation

6.1 parm::ascrv Interface Reference

Public Member Functions

- subroutine **ascrv** (x1, x2, x3, x4, x5, x6)

The documentation for this interface was generated from the following file:

- modparm.f90

6.2 parm::atri Interface Reference

Public Member Functions

- real ∗8 function **atri** (at1, at2, at3, at4i)

The documentation for this interface was generated from the following file:

- modparm.f90

6.3 parm::aunif Interface Reference

Public Member Functions

- real ∗8 function **aunif** (x1)

The documentation for this interface was generated from the following file:

- modparm.f90

6.4 parm::dstn1 Interface Reference

Public Member Functions

- real ∗8 function **dstn1** (rn1, rn2)

The documentation for this interface was generated from the following file:

- modparm.f90

6.5 parm::ee Interface Reference

Public Member Functions

- real ∗8 function **ee** (tk)

The documentation for this interface was generated from the following file:

- modparm.f90

6.6 parm::expo Interface Reference

Public Member Functions

- real ∗8 function **expo** (xx)

The documentation for this interface was generated from the following file:

- modparm.f90

6.7 parm::fcgd Interface Reference

Public Member Functions

- real ∗8 function **fcgd** (xx)

The documentation for this interface was generated from the following file:

- modparm.f90

6.8 parm::HQDAV Interface Reference

Public Member Functions

- subroutine **hqdav** (A, CBW, QQ, SSS, ZCH, ZX, CHW, FPW, jrch)

The documentation for this interface was generated from the following file:

- modparm.f90

6.9 parm::layersplit Interface Reference

Public Member Functions

- subroutine **layersplit** (dep_new)

The documentation for this interface was generated from the following file:

- modparm.f90

6.10 parm::ndenit Interface Reference

Public Member Functions

- subroutine **ndenit** (k, j, cdg, wdn, void)

The documentation for this interface was generated from the following file:

- modparm.f90

6.11 parm::qman Interface Reference

Public Member Functions

- real ∗8 function **qman** (x1, x2, x3, x4)

The documentation for this interface was generated from the following file:

- modparm.f90

6.12 parm::regres Interface Reference

Public Member Functions

- real ∗8 function **regres** (k)

The documentation for this interface was generated from the following file:

- modparm.f90

6.13 parm::rsedaa Interface Reference

Public Member Functions

- subroutine **rsedaa** (years)

The documentation for this interface was generated from the following file:

- modparm.f90

6.14 parm::tair Interface Reference

Public Member Functions

- real ∗8 function **tair** (hr, jj)

The documentation for this interface was generated from the following file:

- modparm.f90

6.15 parm::theta Interface Reference

Public Member Functions

- real ∗8 function **theta** (r20, thk, tmp)

The documentation for this interface was generated from the following file:

- modparm.f90

6.16 parm::vbl Interface Reference

Public Member Functions

- subroutine **vbl** (evx, spx, pp, qin, ox, vx1, vy, yi, yo, ysx, vf, vyf, aha)

The documentation for this interface was generated from the following file:

- modparm.f90

Chapter 7

File Documentation

7.1 main.f90 File Reference

main.f90

Functions/Subroutines

- program main
  this is the main program that reads input, calls the main simulation model, and writes output.

7.1.1 Detailed Description

main.f90

this is the main program that reads input, calls the main simulation model, and writes output.

7.1.2 Function/Subroutine Documentation

7.1.2.1 main()

```
program main ( )
```

this is the main program that reads input, calls the main simulation model, and writes output.

Author

modified by Javier Burguete Tolosa

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