MMF

getvar.c – memcpy fix, use int instead of long, may have copied too much info

putvar.c – memcpy fix, use int instead of long, may have copied too much info

mmf.c – if parameter read error encountered in a file, exit instead of keep reading

setup\_cont.c – added control parameters strmtemp\_humidity\_flag, nhruOut\_format, nsubOut\_format, nsegmentOut\_format

read\_params.c – delimiter between multiple values changed from comma to space, added checking for new line or null at end of parameter values to help read the same file on linux and windows. Still recommend converting to correct line endings for each OS to be more confident on reading files.

MODFLOW

New: gwf2drn7\_NWT.f, gwf2drt7.f, gwf2ets7.f, gwf2evt7.f, gwf2hydmod7.f, gwf2ibs7.f, gwf2rch7.f, gwf2res7.f, gwf2riv7\_NWT.f, gwf2str7.f, gwf2sub7\_NWT.f, gwf2swr7.f, gwf2swr7util.f, mhc7.f, nogmg.f, obs2drn7.f, obs2riv7.f, obs2str7.f

gwf2bas7\_NWT.f

gwf2hfb7\_NWT.f

gwf2lak7\_NWT.f

gwf2mnw17\_NWT.f

gwf2mnw27\_NWT.f

gwf2sfr7\_NWT.f

gwf2upw1.f

gwf2uzf1\_NWT.f

gwf2wel7\_NWT.f

gwflakmodule\_NWT.f

gwfuzfmodule\_NWT.f

Irestart.f

lmt8\_NWT.f

NWT1\_gmres.f90

NWT1\_solver.f

obs2bas7.f

utl7.f

remove gwf\_other\_modules.f90

GSFLOW

gsflow\_budget.f90 - init\_vars\_from\_file>0, fewer variables written to restart file

gsflow\_modflow.f – init\_vars\_from\_file>0, BUG FIX: restart didn’t output stress period number correctly or skip through MODFLOW stress periods to simulation start time, merge with MFNWT 1.1.4, cleaned up some screen messages, allow MFNWT packages not available in GSFLOW mode for MODFLOW-only mode: DRN, RIV, EVT, RCH, RES, STR, IBS, OBS DRN, OBS RIV, OBS STR, ETS, DRT, HYD, SUB, and SWR. Note, packages not supported in any mode: LMG, GFD, GWT, GMG, GWM, CFP, PCGN, FMP. Removed commented code related to GFB. Moved code related to OBS AR routines to after setting start times. Less print for print\_debug = -2, allow for stopping non-convergent simulation in MODFLOW-only mode for ICNVGFLG=0 for simulations with NWT and BUDPERC>STOPER for other solvers, call added for UZF1AD, more args for SFR7AD, cleaned up messages related to stopping or continuing for non-convergence in MODFLOW-only mode, call BAS7OC to skip output control and skip through OBS

gwflow\_prms.f90 – merge in PRMS 5 code for water\_use\_read, dynamic\_param\_read, muskingum\_lake, basin\_summary, nsegment\_summary, convert\_params, and prms\_summary. Added code for temp\_sta. For print\_debug = -2, no model\_output\_file and minimal print of warnings and other informational messages, gvr\_cell\_id is declared and read for GSFLOW mode, map\_results handles this parameter separately, init\_vars\_from\_file>0, allow for model\_modes PRMS5, GSFLOW5, CLIMATE, POTET, TRANSPIRE, and CONVERT, prms\_warmup now in Control File with check for start\_year+prms\_warmup>end\_year, cascade\_flag =2: use hru\_segment, several more modules can now change for restart, things that can’t change: dprst, cascade and cascdgw, nhru, nssr, ngw, nsegment, nhrucell, nlake, model\_mode, temp\_1sta, temp\_laps, temp\_dist2, potet\_pan, transp\_tindex

gsflow\_sum.f90 – removed unused code related to farfield

PRMS

New: muskingum\_lake.f90, dynamic\_param\_read.f90, water\_use\_read.f90, convert\_params.f90, prms\_summary.f90: temp\_sta is a new module, use obs value with additive adjustment only

snowcomp.f90 – use snowpack\_init if init\_vars\_from\_file = 0, 2 or 3, init\_vars\_from\_file>0, allow init variables to be used for init\_vars\_from\_file = 2 or 3 and reordered some code to allow for various values of init\_vars\_from\_file, add SNGL in double to single assignments, BUG FIX: initial Ai values set incorrectly, all HRU values set to last HRU instead of individually, last value of depletion curve passed as first depletion curve value to initialize snowcov\_area, use hru\_ppt instead of basin\_ppt to set emissivity and energy related to convection or condensation, make use tcal is set to 0 at the beginning of each timestep, have to specify depletion curves, was optional if ndepl = 0, fewer variables written to restart file

soilzone.f90 – code related to declare and initialize soil\_moist\_init, ssstor\_init, and soil\_rechr\_init moved to climateflow to allow for PRMS4/PRMS5 option, init\_vars\_from\_file>0, cascade\_flag>0, allow init variables to be used for init\_vars\_from\_file = 2 or 5 and reordered some code to allow for various values of init\_vars\_from\_file, add SNGL in double to single assignments, bug fix make sure slowcoef\_lin and slowcoef\_sq or fastcoef\_lin and fastcoef\_sq are > 0 before using and make sure interflow values are computed as < 0, allow ssr2gw\_rate to be specified as a value between 0 and NEARZERO, previously if a value was <= NEARZERO it was set to 0, fewer variables written to restart file

climateflow.f90 – use tmax\_allrain\_offset instead of tmax\_allrain and soil\_rechr\_init\_frac, soil\_moist\_init\_Frac, ssstor\_init\_frac, and soil\_rechr\_max\_frac for PRMS5, add lake\_vol when needed, init\_vars\_from\_file>0, allow init variables to be used for init\_vars\_from\_file = 2 or 5 and reordered some code to allow for various values of init\_vars\_from\_file, don’t allocate gwres\_stor for GSFLOW mode, add code related to use of temp\_sta, use MAXTEMP (200.0) and MINTEMP (-150.0) parameters from basin.f90 for valid temperature ranges instead of values in code that might vary by module, were -99 to 150, fewer variables written to restart file

srunoff.f90 – added water use code, use sro\_to\_dprst\_perv instead of sro\_to\_dprst for PRMS5, init\_vars\_from\_file>0, allow dprst\_frac\_init to be used for init\_vars\_from\_file = 2 or 7, cascade\_flag>0, , add SNGL in double to single assignments, fewer variables written to restart file

cascade.f90 – allow setting of cascades based on hru\_segment when cascade\_flag = 2, if true don’t need cascade\_tol, cascade\_flg, and circle\_switch or other cascade parameters and used for HRU and GWR cascades

xyz\_dist.f90 - removed restart code, so can change for restart, add SNGL in double to single assignments

basin\_sum.f90 - init\_vars\_from\_file>0, output basin\_swrad instead of basin\_potsw, which were the same

utils\_prms.f90 - use I0 format and I6 to output appropriate number of digits, write to model output file only when print\_debug > -2, but write to log file, cleaner format for writing error messages, remove unused routines check\_param\_value, checkint\_param\_limits, and check\_nhru\_params

ide\_dist.f - removed restart code, so can change for restart, add SNGL in double to single assignments

routing.f90 – add water use code, add code to read Muskingum parameters and compute coefficients so not needed in muskingum.f90 and muskingum\_lake.f90, added code related to declaring variables to accumulate flows based on segment\_type, init\_vars\_from\_file>0, allow for cascade\_flag>0, obsout\_segment added, added message with more detail when a circle is found in segment routing, messages related to checking parameters written if parameter\_check\_flag = 1 instead of print\_debug > -1, new code added by Markstrom to deal with computing values used in stream\_temp for sward and potet when HRUs aren’t associated with a segment, fewer variables written to restart file

gwflow.f90 – add code related to flow to/from the lake bed, init\_vars\_from\_file>0, code added for update for init\_vars\_from\_file = 2 or 6 to use gwstor\_init, added code for water use, fewer variables are written to restart file

water\_balance.f90 – TOOSMALL value changed from 1.0E-05 to 3.1E-05, so could be fewer messages for roundoff error, allow for cascade\_flag>0, add print of net\_apply and apply, add code for water use additions

map\_results.f90 - prms\_warmup in Control File and read in gsflow\_prms where Begyr and End\_year are set, use I0 format and I6 to output appropriate number of digits, gvr\_cell\_id used from gsflow\_prms, variable gvr\_cell\_id now named gvr\_map\_id in code; still the name of the parameter, allow some warnings to be printed only when print\_debug > -1

subbasin.f90 – uncommented code related to lakes

climate\_hru.f90 - use MAXTEMP (200.0) and MINTEMP (-150.0) parameters from basin.f90 for valid temperature ranges instead of values in code that might vary by module, were -99 to 150, add SNGL in double to single assignments

intcp.f90 – added water use code, init\_vars\_from\_file>0, fewer variables are written restart file

basin.f90 – add MAXTEMP (200.0) and MINTEMP (-150.0), some code related to lakes simplified, add lake\_type to set weir\_gate\_flag and puls\_lin\_flag, allow for use of dprst\_frac\_hru and dprst\_area for PRMS 4 and dprst\_frac for PRMS 5, removed declared variable hru\_frac\_dprst, moved some code around, cleaned up output of basic basin characteristics and only write if print\_debug>-2

temp\_dist2.f90 - init\_vars\_from\_file>0, use MAXTEMP (200.0) and MINTEMP (-150.0) parameters from basin.f90 for valid temperature ranges instead of values in code that might vary by module, were -99 to 150

nsub\_summary.f90 – add nsubOut\_format (1 = ES10.3; 2 = F0.2; 3 = F0.3; 4 = F0.4; 5 = F0.5), prms\_warmup in Control File and read in gsflow\_prms where Begyr and End\_year are set, use I0 format and I6 to output appropriate number of digits, allow output of integer variables, simplified code a little, allow any real or double nhru variable to be summarized by subbasins.

muskingum.f90 – code related to Muskingum routing parameters and coefficients moved to routing.f90 so it didn’t need to be in muskingum\_lake and muskingum, add variables that accumulate flows for each segment\_type, init\_vars\_from\_file>0, added obsout\_segment, added code to check for negative flows as water use could cause negative flows, fewer variables written to restart file

nhru\_summary.f90 – allow header of output file to be based on parameter nhm\_id, add nhruOut\_format (1 = ES10.3; 2 = F0.2; 3 = F0.3; 4 = F0.4; 5 = F0.5), prms\_warmup in Control File and read in gsflow\_prms where Begyr and End\_year are set, use I0 format and I6 to output appropriate number of digits, allow output of integer variables, simplified code a little

precip\_dist2.f90 – removed unneeded reference to declvar

nsegment\_summary.f90 – allow header of output file to be based on parameter nhm\_seg, add nsegmentOut\_format (1 = ES10.3; 2 = F0.2; 3 = F0.3; 4 = F0.4; 5 = F0.5), prms\_warmup in Control File and read in gsflow\_prms where Begyr and End\_year are set, use I0 format and I6 to output appropriate number of digits, simplified code a little

temp\_1sta\_laps.f90 – use MAXTEMP (200.0) and MINTEMP (-150.0) parameters from basin.f90 for valid temperature ranges instead of values in code that might vary by module, were -99 to 150, added code for temp\_sta, which is like temp\_1sta but only has additive calibration adjustment and no lapse adjustment, init\_vars\_from\_file>0

obs.f90 – removed restart code, so can change for restart

basin\_summary.f90 – prms\_warmup in Control File and read in gsflow\_prms where Begyr and End\_year are set, use I0 format and I6 to output appropriate number of digits

potet\_pm\_sta.f90 – removed restart code, so can change for restart, add SNGL in double to single assignment

ccsolrad.f90 – reordered some code, not sure why

potet\_pm f90 – removed restart code, so can change for restart, add SNGL in double to single assignment

transp\_tindex.f90 - init\_vars\_from\_file>0

potet\_pt.f90 – removed restart code, so can change for restart, add SNGL in double to single assignment

strmflow\_in\_out.f90 – add variables that accumulate flows for each segment\_type, added obsout\_segment

potet\_pan.f90 - init\_vars\_from\_file>0

sagehen examples,

prms.params, gsflow.params - use PRMS5 parameters, use dimension “one” instead of shorthand, remove prms\_warmup as in Control File, remove numbers after parameter names, change constant parameters to single value

broke up parameter file, changed some to specify as matrix