

! rev. 7.2 sept. 19/94 - added ireach(n) for dwoper input
 ! rev. 7.3 dec. 20/94 - added uz & lz drainage in runof4
 ! rev. 7.31 jan. 08/95 - set record length for 40 flow sta
 ! rev. 7.31.1 jan. 08/95 - set met data source for lapse rate
 ! rev. 7.32 feb. 07/95 - added nopt to select opt flow sta
 ! rev. 7.33 feb. 20/95 - fixed flow initialization
 ! rev. 7.4 feb. 24/95 - added 4 classes - max = 10
 ! rev. not completed
 ! rev. 7.41 apr. 15/95 - calc strmfl output /w inp fmt
 ! rev. 7.42 may. 15/95 - check for div. by 0 in runof4
 ! rev. 7.5 seperate snow covered and bare ground
 ! modified for separation of snowcovered ground and
 ! bare ground by Frank Seglenieks Feb/1995 new
 ! runof5 debugged and intergrated by NK July/1995
 ! rev. 7.51 oct. 08/95 - revise init channel flow in SUB
 ! rev. 7.52 oct. 23/95 - check for opt constraints in main1
 ! rev. 7.6 nov. 13/95 - added andrea's sediment routines
 ! rev. 7.7 dec. 25/95 - added Allyson's Columbia routing
 ! rev. 7.71 jan. 15/95 - fixed bug in uzs calculation
 ! uzs-retn =freely draining water
 ! rev. 7.72 feb. 04/96 - took flowinit.for from sub.for
 ! rev. 7.73 feb. 21/96 - fixed sca-continuity / runof5
 ! rev. 7.74 may. 23/96 - include lapse rate & elv ref
 ! as part of .tmp file
 ! rev. 7.75 may. 27/96 - added ak2fs in param & runof5
 ! rev. 7.76 jun. 11/96 - # classes increased to 16 + urban
 ! rev. 7.77 Jul. 02/96 - fixed snow redistribution
 ! Rev. 7.78 Sept. 29/96 - fileio: modified for error checking

 ! rev. 7.80 Oct. 29/96 - spl7 added yymmdd.rin for res inflows
 ! - unit = 39 fln = 09
 ! rev. 7.81 Nov. 07/96 - rdevt: added flags for stuff
 ! rev. 7.83 Nov. 30/96 - fix div. by 0 - check - in lst.for
 ! rev. 7.84 Dec. 16/96 - changed pmelt so that snowmelt only
 ! occurs on snow covered area

 ! rev. 8.0 Dec 18/96 - Added Todd Neff's evaporation
 ! rev. 8.1 Feb. 15/97 - TBC & RSM (to be continued & resume)
 ! rev. 8.2 Feb. 15/97 - parameter selection for opt in main1
 ! rev. 8.21 Mar. 15/97 - rain/snow choice tied to base temp
 ! rev. 8.22 Mar. 15/97 - glacier MF 2X when new snow=gone
 ! rev. 8.23 Mar. 25/97 - fixed bug in route - keep qo2 for res
 ! rev. 8.24 Apr. 07/97 - added glacier melt multiplier gladjust
 ! - used uzs-retn to determine freely
 ! draining water
 ! rev. 8.25 May. 22/97 - fixed allocating the basin # in
 ! flowinit
 ! rev. 8.3 May. 22/97 - added the simout/outfiles capability
 ! rev. 8.31 June 3/97 - added initial uzs values in evap.par
 ! rev. 8.32 June 13/97 - bypassed non-flagged parameters in OPT
 ! rev. 8.4 July 16/97 - fixed melt routine and added init def
 ! rev. 8.41 July 21/97 - added tipm to the optimization table
 ! rev. 8.5 Oct. 09/97 - deleted the old interception stuff
 ! rev. 8.51 Oct. 09/97 - fixed -ve qr() problem in runof5
 ! rev. 8.52 Nov. 14/97 - replaced x4()= in runof
 ! rev. 8.60 Nov. 14/97 - added sl2 to the interflow calculation
 ! rev. 8.61 Dec. 12/97 - added contflg for statistics cont'n
 ! rev. 8.62 Dec. 30/97 - fixed param s/r comb'd et & par flgs
 ! rev. 8.70 Jan. 23/98 - added precip adjustment in rain.for
 ! rev. 8.71 Feb. 24/98 - added evpflg2 to rdevt.for
 ! rev. 8.72 Mar. 5/98 -tw: moved flgevp2 data statement to

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!
!                               spl.for
! rev. 8.73   Mar.   1/98 - changed mhrd to mhtot in flowinit
! rev. 8.74   Mar.  31/98 - reinvented fs stuff in opt
! rev. 8.75   Apr.  27/98 - took da out of the resume file
! rev. 8.76   May   26/98 - added precadj diagnostic to rain.for
! rev. 8.77   June   1/98 - added sub-basin error calculation
! rev. 8.78   July   7/98 - added scalesnw and scaletem to rdevt
! rev. 8.79   July   7/98 - added 24 water survey format in strfw
! rev. 8.80   July   9/98 - fixed precip shutdown after smearing
! rev. 8.81   July  17/98 - precip adjust for T > 0 C only
! rev. 8.82   July  10/98 - added runoff output option: routeflg
! rev. 8.83   Sep.  23/98 - moved step args to area2.for
! rev. 8.84   Sep.  28/98 - added runoff and evap fields to
!                               spl.txt
! rev. 8.85   Oct.  12/98 - fixed rain & snow on water class
! rev. 8.86   Nov.  02/98 - fixed opt problem found by ted.
!                               - fixed tto(n)=0 problem in etin
! rev. 8.87   Nov.  17/98 - added watbal.for for water balance
! rev. 8.88   Nov.  23/98 - fmadjust function of degree days
! rev. 8.89   Nov.  30/98 - simplified uzs parameters
! rev. 8.90   Dec.  04/98 - input to memory for opt runs
! rev. 8.91   Dec.  07/98 - read rdevt in sub as well as spl!
! rev. 8.92   Dec.  24/89 - check for 100% aclass coverage
! rev. 8.93   Jan.  17/99 - sub modified for spl & watroute
! rev. 8.94   Feb.  01/99 - crseflg to read resume & snow course
! rev. 8.94a  Feb.  02/99 - reset heat deficit to 0.0 on Sept.01
! rev. 8.94b  Feb.  06/99 - temperature correction and stop cmd
! rev. 8.94c&d Feb.  20/99 - made paf.txt/error.txt default order
! rev. 8.94e  Feb.  24/99 - added surfer output for error in lst
! rev. 8.95   Mar.  15/99 - computed mean flows for time increment
!                               - involved getting rid of /kt throughout
! rev. 8.96   Apr.  26/99 - lower zone function related to nbsn
! rev. 8.96.1 May  12/99 - added ireport for reporting interval
! rev. 8.97   July  12/99 - demonstration copy addition
! rev. 8.98   July  15/99 - met grid shifting for weather models
! rev. 8.99   Aug.  18/99 - replaced err= with iostat= for f90
! rev. 8.99a  Jul.    99 - lat-long watershed data
! rev. 8.99b  Sept. 27/99 - divvy up interflow & drainae
! rev. 8.99c  Oct.   5/99 - ough -> sl2 input in shed
! rev. 8.99e  Nov.  29/99 - heat deficit initialization
! rev. 8.99f  Jan.   7/00 - changed uzs calcs re: shari's data
! rev. 8.99g  Feb.   7/00 - added ttoint to init evaporation
! rev. 8.99k  feb. 15/2001 - fixex deficit calc in melt.for see9.06k
! rev. 8.99l  Oct.   2001 - fixed reservoir release timing in spl8
! rev. 8.99mm Dec. 13/2001- added check for <= 0 init res flow
! rev. 8.99n  Dec. 31/2001- fixed nat. res initial flow (JW)
! rev. 9.0    Mar.  21/00 - ts: converted to Fortran 90
!                               - added dynamic memory allocation
!                               - added wfo file for ensim
!                               - added wetland routing model
! rev. 9.01   Aug.   1/00 - added look up for minimum temperature
!                               and function to calculate RH
! rev. 9.02   Oct.   5/00 - added option to debug on one grid
! rev. 9.03   Jan.   7/01 - set min precip rate for smearing
! rev. 9.04   Jan.  16/01 - fixed grid diagnosis in flowinit
! rev. 9.05   Feb.   6/01 - chngd unit 61 to snw1.csv for surfer
! rev. 9.06k  Feb.  15/01 - fixed deficit calc in melt (rem. qlz.txt) =8.99k
! rev. 9.07   Mar.  14/01 - fixed use of opt par's for numa=0
! rev. 9.08   Mar.  26/01 - checked limits on heat def.
! rev. 9.08.01 Apr.   3/01 - check wetland designation in param
! rev. 9.1    May    7/01 - updated Luis's sed & nutrient stuff

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!	rev 9.1.02	July 12/01	- put in dacheck in flowinit for wetland flag
!	rev 9.1.03	July 24/01	- added polinomial to reservoir routing
!	rev. 9.1.04	Oct. 4/01	- added A7 for weighting old/new sca in melt
!			- fixed Jan. 17/02 - didn't work before
!	rev. 8.99n	Dec.31/2001	- fixed nat. res initial flow (JW)
!	rev. 9.1.05	Oct. 4/01	- new format parameter file
!	rev. 9.1.06	Oct. 16/01	- nrvr added to area3 to set # river types
!	rev. 9.1.07	Jan. 3/02	- check that outlet is in a lake
!	rev. 9.1.08	Jan. 17/02	- fixed rev. 9.1.04
!	rev. 9.1.09	Jan. 21/02	- fixed reservoir release timing in spl9 see8.991
!	rev. 9.1.10	Jan. 29/02	- flow nudging added for nopt(1)=2
!	rev. 9.1.11	Feb. 07/02	- fixed bug in reservoir routing
!	rev. 9.1.12	Mar. 15/02	- added xdelta and ydelta for ensim
!	rev. 9.1.13	Mar. 23/02	- fixed resv. timing, moved to beginning of dt
!	rev. 9.1.14	Mar. 24/02	- fixed wetland min time step & outflow
!	rev. 9.1.15	Apr. 02/02	- Luis' sediment stuff runs. Not checked with old version.
!	rev. 9.1.16	Apr. 03/02	- Added wetland conditional to select river w/wo wetland
!	rev. 9.1.17	May 05/02	- Some tidying up
!	rev. 9.1.18	Jun. 03/02	- Added sub-watershed modelling capability
!	rev. 9.1.19	Jun. 22/02	- Added A9 as the max heat deficit/swe ratio
!	rev 9.1.20	Jun. 25/02	- Added A10 as the power on the UZ discharge function
!	rev. 9.1.21	Jun. 28/02	- Added wetland storage & outflow to the wfo file
!	rev. 9.1.22	Jul. 22/02	- Added simout\error.r2s file for ENSIM_Hydrologic
!	rev. 9.1.23	Jul. 23/02	- Added control for nudging in event #1
!	rev 9.1.24	Sep. 11/02	- Added scaleallsnw to set snw scale in event 1
!	rev 9.1.25	Sep. 11/02	- Added A11 as bare ground equiv. vegn height
!	rev. 9.1.26	Sep. 11/02	- fixed wetland evaporation re: uzsi
!	rev. 9.1.27	Sept. 19/02	- Added isbaflg
!	rev. 9.1.28	Sept. 19/02	- Added shedlfg to replace the bsnm.shd file
!	rev. 9.1.29	Nov. 07/02	- Changed the threshold flow values for error calculations
!	rev. 9.1.30	Nov. 08/02	- added q1, qint, drng & qlz to the wfo file
!	rev. 9.1.31	Nov. 13/02	- Fixed the wetland Q to account for wetland area
!	rev. 9.1.32	Nov. 20/02	- Fixed fpetmon() wrt. h()
!	rev. 9.1.33	Dec. 05/02	- Fixed instability in wetland flow
!	rev. 9.1.34	Dec. 23/02	- Added ensim1flg - if ensimflg='a' for 1st id then 'y' for all
events			
!	rev. 9.1.35	Dec. 26/02	- Added wetland & channel heights to the wfo file
!	rev. 9.1.36	Jan. 28/03	- Fixed wetland init condition in flowinit
!	rev. 9.1.37	Mar. 22/03	- Option to turn off leakage by setting LZf < 0.0
!	rev. 9.1.38	Mar. 31/03	- revised str header and routing dt selectable
!	rev. 9.1.39	Apr. 06/03	- Fixed wetland routing when channel is dry
!	rev. 9.1.40	Apr. 24/03	- Min time step A6 read in strfw over rides the A6 from the par
file			
!	rev. 9.1.41	May 15/03	- Event average flows output to unit=75
!	rev. 9.1.42	May 31/03	- Tracer module added - first try
!	rev. 9.1.43	Jun. 01/03	- Fixed the qdwpr.txt function - re: last grid in lake
!	rev. 9.1.44	Jun. 11/03	- Added Cumulative precip to the wfo file
!	rev. 9.1.45	Jun. 11/03	- WATROUTE: runoff, recharge and leakage files added
!	rev. 9.1.46	Jul. 17/03	- WATFLOOD LITE incorporated
!	rev. 9.1.47	July 24/03	- TS: Tracer s/r deallocations added
!	rev. 9.1.48	Dec. 08/03	- NK: sumrechrge() added to get total recharge
!	REV. 9.1.49	Nov. 23/03	- TS: Added wetlands to GW Tracer + Wetland Tracer
!	rev. 9.1.50	Jan. 14/04	- NK: version number added to the wfo_spec.txt file
!	rev. 9.1.51	Jan. 28/04	- NK: added iz.ne.jz conditional to ENSIM output
!	rev. 9.1.52	Mar. 11/04	- NK: continuous water quality modelling
!	rev. 9.1.53	Mar. 14/04	- NK: hasp key configured
!	rev. 9.1.54	Apr. 12/04	- NK: SEDFLG set for multiple events at event No. 1
!	rev. 9.1.55	Jun. 12/04	- NK: write new str files to strfw\newfmt folder.
!	rev. 9.1.56	Jun. 18/04	- NK: write new rel & rin files to resrl\newfmt folder.
!	rev. 9.1.57	Jul. 06/04	- NK: Fixed major bug in shed.for max instead of min
!	rev. 9.1.58	Jul. 12/04	- NK: New header for the .shd file

! rev. 9.1.59 Jul. 15/04 - NK: split rerout into two parts: rdresv & rerout
 ! rev. 9.1.60 Jul. 27/04 - NK: reversed definitions for sl1 & sl2 Int. Slope
 ! rev. 9.1.61 Aug. 25/04 - NK: Check for repeated met data in RAIN
 ! rev. 9.1.62 Sep. 08/04 - NK: Fixed the conversion factor in SNW.FOR (cnv)
 ! rev. 9.1.63 Sep. 29/04 - NK: Added iopt_start as an arg for quick filecheck
 ! rev. 9.1.64 Oct. 03/04 - NK: Coded up new header in ragmet.for
 ! rev. 9.1.65 Oct. 03/04 - NK: Coded up new header for snow course file
 ! rev. 9.1.66 Oct. 17/04 - NK; pet*ftall for loss from water instead of pet
 ! rev. 9.1.67 Oct. 21/04 - NK; added unit 80 for lake_stor & lake_flow
 ! rev. 9.1.68 Dec. 19/04 - NK: rewrote rdflow c/w memory allocation
 ! rev. 9.1.69 Dec. 19/04 - NK: rewrote rdresv c/w memory allocation
 ! rev. 9.1.70 Dec. 21/04 - NK: rewrote rdrain c/w memory allocation
 ! rev. 9.1.71 Dec. 28/04 - NK: rewrote rdtemp c/w memory allocation
 ! rev. 9.1.72 Dec. 28/04 - NK: fix bug in rdresv setting reach #
 ! rev. 9.1.73 Jan. 25/05 - NK: rewrote rdcrse c/w memory allocation
 ! rev. 9.1.74 Feb. 08/05 - NK: trashed rscrse replaced with rdswe
 ! rev. 9.1.75 Feb. 08/05 - NK: added rdgsm (gridded soil moisture)
 ! rev. 9.1.76 Mar. 09/05 - NK: separated glacier parameters in par file
 ! rev. 9.1.77 Mar. 07/05 - NK: added .psm .gsm & .glz files
 ! rev. 9.1.78 Mar. 15/05 - NK: added WQD file to event file
 ! rev. 9.1.79 Mar. 30/05 - NK: ktri to area2 for reservoir inflow dt
 ! rev. 9.1.80 Mar. 31/05 - NK: added sublimation (sublim)
 ! rev. 9.1.81 Apr. 04/05 - NK: added sublimation,et and etfs to wfo file
 ! rev. 9.2 Jun. 02/05 - NK: Numerous changes to program organization
 ! rev. 9.2.01 Jun. 29/05 - NK: Added write_r2s
 ! rev. 9.2.02 Jun. 29/05 - NK: Added read_r2s
 ! rev. 9.2.03 Jul. 11/05 - NK: Added s/r precip_adjust
 ! rev. 9.2.04 Jul. 13/05 - NK: allocation check for resr1
 ! rev. 9.2.05 Jul. 15/05 - NK: reversed order of reading resume file
 ! rev. 9.2.05 Jul. 27/05 - NK: initialized delta in s/r compute_error
 ! rev. 9.2.06 Jul. 28/05 - NK: normalized error with da for optimization
 ! rev. 9.2.07 Jul. 29/05 - NK: soilinit moved from runoff to sub
 ! rev. 9.2.08 Jul. 29/05 - NK: opt work-around in options
 ! rev. 9.2.09 Sep. 11/05 - NK: removed write_par.for from rdpar.for
 ! rev. 9.2.10 Sep. 11/05 - NK: unlimited comments on .shd & .map files
 ! rev. 9.2.11 Sep. 15/05 - NK: added Manning's n r1n & r2n
 ! rev. 9.2.12 Sep. 15/05 - NK: added EXCEL eqn to flowinit
 ! rev. 9.2.13 Sep. 28/05 - NK: added freeze and break up to route
 ! rev. 9.2.14 Sep. 29/05 - NK: Added control for opt in event #1
 ! rev. 9.2.15 Sep. 30/05 - NK: Fixed bug for opt in flowinit
 ! rev. 9.2.16 Oct. 10/05 - NK: Fixed bug for widep in rdpar
 ! rev. 9.2.17 Oct. 11/05 - NK: Fixed bug for .str bounds in route
 ! rev. 9.2.18 Oct. 27/05 - NK: Fixed bug in flowinit (init spike)
 ! rev. 9.2.19 Oct. 28/05 - NK: Compute daily & monthly flows
 ! rev. 9.2.20 Oct. 28/05 - NK: WFO_SPEC - reporting start & finish times
 ! rev. 9.2.21 Nov. 11/05 - NK: Set nopt in first event .str file
 ! rev. 9.2.22 Nov. 15/05 - NK: Fixed hmax bug in rdpar
 ! rev. 9.2.23 Nov. 22/05 - NK: Fixed res(n)=0 bug in route
 ! rev. 9.2.24 Dec. 07/05 - BT: DDS optimization
 ! rev. 9.2.25 Dec. 13/05 - NK: ENSIM r2c gridded soil moisture
 ! rev. 9.2.26 Dec. 23/05 - NK: Fixed reservoir outlet location bug
 ! rev. 9.2.27 Jan. 20/06 - NK: Separated header read in rdtemp
 ! rev. 9.2.28 Jan. 30/06 - NK: Added low slope a4 for grids with water
 ! rev. 9.2.29 Feb. 07/06 - NK: Read resv coeff first event only
 ! rev. 9.2.30 Feb. 07/06 - NK: Added class_distribution.txt to output
 ! rev. 9.2.31 Feb. 09/06 - NK: Added area check to rdresume
 ! rev. 9.2.32 Feb. 10/06 - NK: Added area_check.csv to output
 ! rev. 9.2.33 Feb. 14/06 - NK: str stations from first event ONLY!!
 ! rev. 9.2.34 Mar. 21/06 - NK: Activated glacier tracer1
 ! rev. 9.2.35 Mar. 22/06 - NK: Glacier flow bypasses wetlands
 ! rev. 9.2.36 Mar. 30/06 - NK: Scaleallsnow changed to scale precip snow

! rev. 9.2.37 Mar. 31/06 - NK: Removed impervious area as special class
! rev. 9.2.38 Apr. 28/06 - NK: Lower bound set on a12 for smearing
! rev. 9.2.39 May. 09/06 - NK: t added to route & rerout arg list
! rev. 9.2.40 Jun. 09/06 - NK: added tto(),ttomin(),ttomax() to resume
! rev. 9.2.41 Jun. 15/06 - NK: changed the resin.txt file to resin.csv
! rev. 9.2.42 Jun. 20/06 - NK: water class included in the water balance
! rev. 9.2.43 Jun. 21/06 - NK: fixed spikes in route
! rev. 9.3.02 Jul. 18/06 - NK: converted runoff, rchrg & lkage to r2c
! rev. 9.3.03 Sep. 09/06 - NK: read s(i,j) from table instead of grid
! rev. 9.3.04 Oct. 24/06 - NK: routing parameters dim to na in rte
! rev. 9.3.05 Nov. 13/06 - NK: added write_flowinit.for to flowinit.for
! rev. 9.3.06 Dec. 17/06 - NK: added precip adjustment for bias
! rev. 9.3.07 Dec. 29/06 - NK: added sum_precip for whole domain
! rev. 9.3.08 Jan. 15/07 - NK: added lzs_init_new.r2c output to sub.for
! rev. 9.3.09 Jan. 17/07 - NK: all file name lengths = 60 in area12
! rev. 9.3.10 Jan. 29/07 - NK: routing pars changed to gridded values
! rev. 9.3.11 Feb. 28/07 - NK: ch_par added / event file ver = 9.5
! rev. 9.4.01 Apr. 17/07 - NK: added deltat_report for gridflow.r2c
! rev. 9.4.02 Apr. 18/07 - NK: moved rf, rffs from areawq to area1
! rev. 9.4.03 Apr. 18/07 - NK: For water ev(n,ii)=pet(n,ii)*fpet(ii)
! rev. 9.4.04 Apr. 23/07 - NK: moved allocate for melt from melt > spl
! rev. 9.4.05 May. 04/07 - NK: revised timer for julian day calc.
! rev. 9.4.06 May. 09/07 - NK: replaced por with spore(n,ii) in runoff6
! rev. 9.4.07 May. 15/07 - NK: converted opt to gridded routing parameters
! rev. 9.4.08 May. 29/07 - NK: changed baseflow argument list
! rev. 9.4.09 Jun. 19/07 - NK: added lake_area as a variable for iso
! rev. 9.4.10 Jun. 19/07 - NK: adjusted frac for channel water area
! rev. 9.4.11 Jun. 22/07 - NK: reordered rerout for glake
! rev. 9.4.12 Jul. 06/07 - NK: put qr + qstream - strloss back in runoff6
! rev. 9.4.13 Jul. 09/07 - NK: modified lzs to account for lake area (flowinit)
! rev. 9.4.14 Jul. 09/07 - NK: added lake loss file
! rev. 9.4.15 Jul. 31/07 - NK: moved stuff from resume -> soil & flow init
! rev. 9.5 Sep. 07/07 - NK: changed wetland/channel routing
! rev. 9.5.01 Oct. 15/07 - NK: added wetland continuity check
! rev. 9.5.02 Oct. 21/07 - NK: set init qdwpr=0.0 in route
! rev. 9.5.03 Dec. 09/07 - NK: added reads for precip isotopes
! rev. 9.5.04 Dec. 27/07 - NK: fixed bug in wetland routing
! rev. 9.5.05 Jan. 13/08 - NK: added check for rec() in spl
! rev. 9.5.06 Feb. 05/08 - NK: added pool and pool_o in rdpar & route
! rev. 9.5.07 Feb. 05/08 - NK: fixed double counting of strloss & qstream
! rev. 9.5.08 Feb. 08/08 - NK: new event parser
! rev. 9.5.09 Feb. 12/08 - NK: added evap.r2c to the output files
! rev. 9.5.10 Feb. 12/08 - NK: added water_area in lake_evap
! rev. 9.5.11 Feb. 12/08 - NK: added -ve storage check for reservoirs
! rev. 9.5.12 Feb. 13/08 - NK: added evaporation input file with read_r2c
! rev. 9.5.13 Feb. 25/08 - NK: changed tolerance for coordinate check to .gt.0.001
! rev. 9.5.14 Feb. 26/08 - NK: padded rel file for missing data
! rev. 9.5.15 Feb. 28/08 - NK: fixed tdum & xdum for proper grid area in lat-long
! rev. 9.5.16 Feb. 28/08 - NK: moved precip_adjust to sub
! rev. 9.5.17 Feb. 28/08 - NK: moved scale snow from sub to process rain
! rev. 9.5.18 Mar. 03/08 - NK: added conv to options & sub argument list
! rev. 9.5.19 Mar. 05/08 - NK: prevented use of tracer * iso models with nudging
! rev. 9.5.20 Mar. 06/08 - NK: added resvstore for iso model
! rev. 9.5.21 Mar. 06/08 - NK: fixed dtmin for first time step each event
! rev. 9.5.22 Mar. 12/08 - NK: added grdfldg to print gridded flow, swe & evap
! rev. 9.5.23 Mar. 12/08 - NK: fixed allocation error in read_resv_ef
! rev. 9.5.24 Mar. 18/08 - NK: fixed missing data in read_resl_ef.f
! rev. 9.5.25 Mar. 20/08 - NK: fixed lake initiation - moved code route -> flowinit
! rev. 9.5.26 Apr. 04/08 - NK: added Julian day calc. to read_evt
! rev. 9.5.27 Apr. 15/08 - NK: fixed allocation for chnl in rdpar
! rev. 9.5.28 Apr. 15/08 - NK: fixed allocation for inbsnflg in flowinit

! rev. 9.5.29 May. 26/08 - NK: fixed initialization in read_resv_ef
 ! rev. 9.5.30 May. 26/08 - NK: conv back in read_rain & process_rain arg. list
 ! rev. 9.5.31 May. 27/08 - NK: moved tots nw(n) computation in sub
 ! rev. 9.5.32 Jun. 04/08 - NK: compute reservoir levels
 ! rev. 9.5.33 Sep. 12/08 - NK: added column labels for grapher in flow_station_location.xyz
 ! rev. 9.5.34 Sep. 17/08 - NK: fixed lake area in flowinit
 ! rev. 9.5.35 Sep. 22/08 - NK: moved flow_sta_location to flowinit
 ! rev. 9.5.36 Oct. 01/08 - NK: fixed ires bug for unevent dx & dy in read_resv
 ! rev. 9.5.37 Oct. 14/08 - NK: added deltat_report to lake_sd.csv file write
 ! rev. 9.5.38 Oct. 14/08 - NK: added optional coef6 & 7 to rel file for lake levels
 ! rev. 9.5.39 Oct. 15/08 - NK: fixed bug in reservoir routing
 ! rev. 9.5.40 Oct. 21/08 - NK: added diversions to rerout
 ! rev. 9.5.41 Oct. 22/08 - NK: read in reservoir coefficients each event
 ! rev. 9.5.42 Oct. 22/08 - NK: added b7() as the initial lake surface elevation
 ! rev. 9.5.43 Oct. 27/08 - NK: changed bottom part of par file to be free format
 ! rev. 9.5.44 Oct. 27/08 - NK: removed code & obj modules for hasp & rainbow
 ! rev. 9.5.45 Dec. 16/08 - NK: added various error calculations - user's choice with errflg
 ! rev. 9.5.46 Dec. 23/08 - NK: trying to fix problem with -ve storage. Changed conditional
 to .lt.
 ! rev. 9.5.47 Dec. 26/08 - NK: add flwinitflg to warn about initial flows
 ! rev. 9.5.48 Dec. 26/08 - NK: added event_fln() to allow unlimited events
 ! rev. 9.5.49 Dec. 31/08 - NK: changed conditional to read releases in rerout
 ! rev. 9.5.50 Jan. 05/09 - NK: read evap data for reaches only
 ! rev. 9.5.51 Jan. 13/09 - NK: added reading yyyyymmdd_ill.pt2 for all lakes
 ! rev. 9.5.52 Jan. 20/09 - NK: added reading yyyyymmdd_div.pt2 for diversions
 ! rev. 9.5.53 Jan. 20/09 - NK: undid rev. 9.5.40
 ! rev. 9.5.54 Feb. 11/09 - NK: undid rev. 9.2.28
 ! rev. 9.5.55 Feb. 11/09 - NK: Correct R2n for instream lakes
 ! rev. 9.5.56 Mar. 26/09 - NK: Fix bug with month in yearly events
 ! rev. 9.5.57 Apr. 13/09 - NK: added ntrflg for natural lake flows
 ! rev. 9.5.58 Apr. 16/09 - NK: added nudgflg for forcing gauge flows
 ! rev. 9.5.59 Jul. 26/09 - NK: added fpet_lake for each lake in ill file
 ! rev. 9.5.60 Sep. 01/09 - NK: added deltat_report for lake_sd.csv file
 ! rev. 9.5.61 Sep. 03/09 - NK: bug/eloss - added water class for wfo weighted et
 ! rev. 9.5.62 Sep. 04/09 - NK: new tb0 file for DW routing
 ! rev. 9.5.63 Sep. 04/09 - NK: moved lapse rate from melt.f to process_temp.f
 ! rev. 9.5.64 Sep. 16/09 - NK: corrected nudging wrt first event
 ! rev. 9.5.65 Sep. 26/09 - NK: lapse rate changed from dC per 100 m to dC per m
 ! rev. 9.5.66 Oct. 06/09 - NK: fixed bug in flowinit for init flows < 1.0
 ! rev. 9.5.67 Oct. 06/09 - NK: fixed bug in rerout
 ! rev. 9.5.68 Oct. 07/09 - NK: debugged read_resvin_ef.f
 ! rev. 9.5.69 Oct. 10/09 - NK: added xcount & ycount to error & paf files
 ! rev. 9.5.70 Oct. 11/09 - NK: fixed timer for r2c frames (use year_now)
 ! rev. 9.5.71 Oct. 12/09 - NK: fixed bug in lst for setting value for nhyd(,)
 ! rev. 9.5.72 Oct. 12/09 - NK: fixed bug in rdpar setting init values for fpet & ftal
 ! rev. 9.5.73 Oct. 12/09 - NK: bypass using lake levels when optimizing
 ! rev. 9.5.74 Oct. 21/09 - NK: in opt - made optim abs(optim)
 ! rev. 9.5.75 Oct. 26/09 - NK: commented "deallocate in sub for watroute reads
 ! rev. 9.5.76 Oct. 26/09 - NK: fixed basin exclusion for opt if resin present
 ! rev. 9.5.77 Oct. 26/09 - NK: fixed some inits for out of basin gauges
 ! rev. 9.5.78 Nov. 04/09 - NK: matched resvin locations to reach numbers
 ! rev. 9.5.79 Nov. 04/09 - NK: added resumflg='s' for read_soilinit ONLY
 ! rev. 9.5.80 Dec. 20/09 - NK: added swe_locations.txt file for swe input
 ! rev. 9.5.81 Jan. 16/10 - NK: allow reservoirs outside watershed in resv file
 ! rev. 9.5.82 Jan. 26/10 - NK: replaced error check for inflow locations
 ! rev. 9.5.83 Feb. 17/10 - NK: non_basin exclusion for dds_flag=1
 ! rev. 9.6.01 Mar. 01/10 - NK: DDS capability added
 ! rev. 9.6.01 Mar. 01/10 - NK: rlake parameter added for Manning n correction
 ! rev. 9.6.02 Mar. 15/10 - NK: add sublimation to optimization
 ! rev. 9.6.02 Mar. 23/10 - NK: add cumm_domain_precip
 ! rev. 9.6.03 Mar. 31/10 - NK: replaced leakage.dat by nbs.tb0 fln(79)

! rev. 9.6.04 Apr. 05/10 - NK: fixed filename carry over in read_evt
! rev. 9.6.05 Apr. 06/10 - NK: added store_error_flag for -ve storage grids
! rev. 9.6.06 Apr. 18/10 - NK: added glacier adjust for optimization
! rev. 9.7.00 May. 26/10 - NK: dds with pre-emption
! rev. 9.7.01 Jun. 09/10 - NK: fixed error.xyz & error.r2s
! rev. 9.7.02 Jun. 24/10 - NK: fixed bug in rdpar for classcount for imp area
! rev. 9.7.03 Jun. 24/10 - NK: normalized SSE with station Qmean**2
! rev. 9.7.04 Aug. 30/10 - NK: added to error message in read_rain & read_temp
! rev. 9.7.04 Aug. 31/10 - NK: changed # decimal points for r2c files header
! rev. 9.7.05 Aug. 31/10 - NK: changed error.r2s to error.r2c
! rev. 9.7.06 Sep. 01/10 - NK: fixed subscript out of range errors in flowinit
! rev. 9.7.07 Sep. 05/10 - NK: increased allowed # flow stations from 128 to 512
! rev. 9.7.08 Sep. 21/10 - NK: revised mean squared error weighting for DDS
! rev. 9.7.09 Sep. 29/10 - NK: corrected error.r2c file for sub-basin errors
! rev. 9.7.09 Oct. 02/10 - NK: ensure fpet_lake is not assigned unintended values
! rev. 9.7.10 Oct. 11/10 - NK: update flowflag in lst.f for subsequent events
! rev. 9.7.11 Nov. 22/10 - NK: added monthly_climate_deltas.txt file
! rev. 9.7.12 Nov. 10/10 - NK: fix array bugs for reservoir inflows
! rev. 9.7.13 Nov. 22/10 - NK: Changed the outfiles.txt for more 30 rff classes
! rev. 9.7.14 Nov. 22/10 - NK: Allow 30 land cover classes
! rev. 9.7.15 Dec. 14/10 - NK: Create reduced precip & temp files for sub-basins
! rev. 9.7.16 Jan. 05/11 - NK: Fixed init flows outside sub-basin
! rev. 9.7.17 Jan. 05/11 - NK: Fixed diversions outside sub-basin
! rev. 9.7.18 Jan. 17/11 - NK: Changed tolerance on the grid check in read_rain & read_temp
! rev. 9.7.19 Jan. 18/11 - NK: Added sensitivity analysis
! rev. 9.7.20 Jan. 31/11 - NK: Moved open statement for rdpar to rdpar/f
! rev. 9.7.21. Mar. 07/11 - NK: Fixed delta_reort for longer periods in lst
! rev. 9.7.22. Mar. 07/11 - NK: Changed diversion code: give/route take/rerout
! rev. 9.7.23 Mar. 18/11 - NK: Revamped auto hydrograph fitting with precip icode=-2
! rev. 9.7.24 Apr. 20/11 - NK: Added diverflg to indicate if a diversion is in grid
! rev. 9.7.25 Apr. 28/11 - NK: Fixed daily flows
! rev. 9.7.27 May. 26/11 - NK: Add lake_ice_factor
! rev. 9.7.28 Jun. 14/11 - NK: Add degree_day for lake_ice_factor dd_ice
! rev. 9.7.29 Jul. 07/11 - NK: Add sublim_rate to set sublimation rate/day to par file
! rev. 9.7.30 Jul. 13/11 - NK: imax > ycount & jmax > xcount also imin > 1 jnim > 1
! rev. 9.8.00 Jul. 14/11 - NK: ntype+1 replaced by classcount (plus all derivatives)
! rev. 9.8.01 Jul. 21/11 - NK: added ragmet optimization to dds setup
! rev. 9.8.02 Jul. 26/11 - NK: reactivated meander length
! rev. 9.8.02 Aug. 02/11 - NK: added lake level tb0 file
! rev. 9.8.03 Aug. 08/11 - NK: check no of mean observed flows in file are ok
! rev. 9.8.04 Sep. 02/11 - NK: Fix bug in write)par_10 when reading old par file
! rev. 9.8.05 Oct. 18/11 - NK: New read_par_parser subroutine
! rev. 9.8.06 Nov. 08/11 - NK: Added check for `water` class name
! rev. 9.8.07 Oct. 10/11 - NK: area_check - removed unused stations
! rev. 9.8.08 Nov. 18/11 - NK: added fratio for interception hight optimization
! rev. 9.8.09 Nov. 22/11 - NK: nopt(1)=0 for area_error(1) > 10%
! rev. 9.8.10 Dec. 06/11 - NK: Added message for FP overflow in route
! rev. 9.8.11 Dec. 06/11 - NK: removed 30 char limit on find filetype
! rev. 9.8.12 Dec. 07/11 - NK: removed 30 char limit on find filetype
! rev. 9.8.12 Dec. 08/11 - NK: recognize kenueflg in the event file
! rev. 9.8.13 Jan. 17/12 - NK: modifications to read_r2c for single frame data
! rev. 9.8.14 Jan. 27/12 - NK: dds_penalty added for swe not to zero in summer
! rev. 9.8.15 Mar. 12/12 - NK: write error.txt for every dds evaluation
! rev. 9.8.16 Mar. 21/12 - NK: reinstate reservoir inflow error for dds
! rev. 9.8.17 Apr. 24/12 - NK: Moved dds flags to top of par file
! rev. 9.8.18 Apr. 26/12 - NK: Added in-basin check in tracer4
! rev. 9.8.19 May. 10/12 - NK: Added check on missing init flow for lakes
! rev. 9.8.20 MAy. 15/12 - NK: fixed lake area in flowinit9.5.34
! rev. 9.8.21 Jun. 18/12 - NK: Added swe observed date & report
! rev. 9.8.22 Jul. 17/12 - NK: Added resetflg to reset cumm. precip Sept.1
! rev. 9.8.23 Aug. 03/12 - NK: Added resinid1flg to use resinflg for id=1

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! rev. 9.8.24 Aug. 07/12 - NK: Added reading yyyyymmdd_lvl.tb0 for lake levels
! rev. 9.8.25 Sep. 26/12 - NK: Added warning for resumflg=y and ID > 1
! rev. 9.8.26 Sep. 26/12 - NK: Added error check on # chained files for id>1'
! rev. 9.8.27 Sep. 27/12 - NK: changed action on resumflg='s' - keep tbcflg='y'
! rev. 9.8.28 Oct. 12/12 - NK: fixed heat deficit reset for resume
! rev. 9.8.29 Oct. 15/12 - NK: added wetland_flag to speed up route.f
! rev. 9.8.30 Oct. 16/12 - NK: remove p(i,j)=0.0 from precip_adjust
! rev. 9.8.31 Oct. 16/12 - NK: continue rff files for contflg = y
! rev. 9.8.32 Oct. 19/12 - NK: Fixed format for resin.csv in lst.f
! rev. 9.8.33 Oct. 23/12 - NK: Deleted header for rff files with resumflg = y
! rev. 9.8.34 Oct. 23/12 - NK: Added sums to the resume.txt file
! rev. 9.8.35 Oct. 23/12 - NK: Fixed bug in read_soilinit_ef
! rev. 9.8.36 Oct. 23/12 - NK: added fields to rff files
! rev. 9.8.37 Oct. 27/12 - NK: added section to read_flow_ef to check # columns = no
! rev. 9.8.38 Nov. 13/12 - NK: changed name level_plotting.xyz > level_station_location.xyz
! rev. 9.8.39 Nov. 26/12 - NK: added check for flow stations in lakes
! rev. 9.8.40 Jan. 14/13 - NK: convert interception cap: h(,)*fratio()
! rev. 9.8.41 Jan. 28/13 - NK: fixed bug in lst for level print statement
! rev. 9.8.42 Jan. 31/13 - NK: fixed bug in read_resvin: nopti int conversion
! rev. 9.8.43 Jan. 31/13 - NK: fixed bug in lst.f : undefined output for iopt=99
! rev. 9.8.44 Jan. 31/13 - NK: fixed bug in sub.f : uninitialized course_calc(n,j)
! rev. 9.8.45 Jan. 31/13 - NK: disabled some writes for iopt = 99
! rev. 9.8.46 Feb. 04/13 - NK: Fixed some write formats in lst,stats,watbal
! rev. 9.8.47 Feb. 04/13 - NK: Headers added for spl & resin csv files
! rev. 9.8.48 Feb. 12/13 - NK: Replaced spl.plt with spl.tb0 file
! rev. 9.8.49 Feb. 20/13 - NK: Added n=municipal & irrigation withdrawals
! rev. 9.8.50 Feb. 27/13 - NK: Initialize store1&2() for zero lake outflow
! rev. 9.8.51 Mar. 11/13 - NK: Link skiphours in s/r stats to value1 in the str file
! rev. 9.8.52 Mar. 20/13 - NK: deleted a pause for dds runs in route
! rev. 9.8.53 Mar. 20/13 - NK: Add Lake St. Joseph diversion algorithm to REROUT.f
! rev. 9.8.54 Apr. 02/13 - NK: deltat conversion seconds to hours
! rev. 9.8.55 Apr. 10/13 - NK: fixed pause for dds runs in route
! rev. 9.8.56 Apr. 10/13 - NK: Added check in rerout for -ve storage due to evaporation
! rev. 9.8.57 Apr. 12/13 - NK: Added lakeEflg to stop lake evaporation whan levels very low
! rev. 9.8.58 Apr. 12/13 - NK: REvised Family Lake (WPEGR) O/R in rerout
! rev. 9.8.59 May 14/13 - NK: REMoved psmeat & punused from the program
! rev. 9.8.60 May 14/13 - NK: fixed ice factor for whole x-section
! rev. 9.8.61 May 22/13 - NK: Introduced flag1 to speed up runof6
! rev. 9.8.62 May 22/13 - NK: Fixed bug in runof6: (classcount-3) to (classcount-2)
! rev. 9.8.63 May 22/13 - NK: Fixed bug in s/r SUB.f argument list: "jan" missing
! rev. 9.8.64 May 28/13 - NK: Undocumented debug file
! rev. 9.8.65 May 28/13 - NK: Dimensioned firstpass_local()in REROUT
! rev. 9.8.66 Jun 03/13 - NK: Added error_Dv.txt output in stats.f
! rev. 9.8.67 Jun 06/13 - NK: Added allocation for flag1
! rev. 9.8.68 Jun 17/13 - NK: Added dds_override file
! rev. 9.8.69 Jun 17/13 - NK: Fixed bug in allocating clumnunits in SUB.f
! rev. 9.8.70 Jun 17/13 - NK: for PAF: change error & PAF files to use GK formats
! rev. 9.8.71 Jul 08/13 - NK: Made universal the use of wetland_flag(n)
! rev. 9.8.72 Jul 16/13 - NK: Fixed divertflg to have the first event file value
! rev. 9.8.73 Jul 19/13 - NK: Fixed wetland conditional screwed up with rev 9.8.77 in
runof6
! rev. 9.8.80 Aug 09/13 - NK: Added withdraw.r2c output file in route.f
! rev. 9.8.81 Sep. 03/13 - NK: Add pafflg and update precip adjustment factors
PAF!*****
! rev. 9.8.82 Sep. 07/13 - NK: Bypass of hard-coded lake rules when coeff1=0
! rev. 9.8.83 Sep. 10/13 - NK: Set classcount=0 for fli.exe program only
! rev. 9.8.84 Sep. 15/13 - NK: Added fratio to list of equal values for bog & fen
! rev. 9.8.85 Sep. 30/13 - NK: Fixed the water balance for Lake St. Jo so diversion is
taken care of
! rev. 9.8.86 Oct. 16/13 - NK: Added version no to stats.txt output
! rev. 9.8.87 Oct. 25/13 - NK: Added error message for mismatched resume file

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! rev. 9.8.88 Oct. 26/13 - NK: Fixed header writing sequence for spl.tb0
 ! rev. 9.8.89 Oct. 27/13 - NK: Fixed undefined (NaN) problem in flowint
 ! rev. 9.8.90 Oct. 30/13 - NK: Added fetch to the shd file
 ! rev. 9.8.91 Oct. 30/13 - NK: Got rid of lzs_init.r2c - data is in flow_init.r2c already
 ! rev. 9.8.92 Nov. 06/13 - NK: Changed output file swe.txt to swe.csv
 ! rev. 9.8.93 Nov. 12/13 - NK: Added the routing initialization with yyyymmdd_fli.r2c
 ! rev. 9.8.94 Nov. 20/13 - NK: Added check on interception capacity for water
 ! rev. 9.8.95 Nov. 20/13 - NK: Changed unit 58 to 955 for spl.tb0
 ! rev. 9.9.00 Dec. 08/13 - NK: Added Lake Evaporation model
 ! rev. 9.9.01 Dec. 12/13 - NK: Added `pintwarning' in route added
 ! rev. 9.9.02 Dec. 12/13 - NK: Changed format for origin in wfo code
 ! rev. 9.9.03 Dec. 15/13 - NK: Change to gridded latitude for etharg
 ! rev. 9.9.04 Dec. 17/13 - NK: Change over to gridded climate normals to diff
 ! rev. 9.9.05 Jan. 02/14 - NK: Add check if in-basin in flowinit
 ! rev. 9.9.06 Jan. 08/14 - NK: Add daily differences to Harfreaves ETHarg.f
 ! rev. 9.9.07 Jan. 10/14 - NK: Overhaul of the frame numbers to EnSim specs
 ! rev. 9.9.08 Jan. 10/14 - NK: Add check on diversion locations in read_divert'
 ! rev. 9.9.09 Feb. 24/14 - NK: Fixed reading the time stame in r2c frame headers
 ! rev. 9.9.10 Mar. 20/14 - NK: Update swe anytime a file is found
 ! rev. 9.9.11 Mar. 20/14 - NK: Added lake_level_init.pt2 file for a resume
 ! rev. 9.9.12 Apr. 04/14 - NK: Added min & max lake_level output file
 ! rev. 9.9.13 Apr. 04/14 - NK: Fix water balance
 ! rev. 9.9.14 Jun. 02/14 - NK: Fix water balance for water class
 ! rev. 9.9.15 Jun. 02/14 - NK: Add lz to the water balance - it was missing
 ! rev. 9.9.16 Jun. 06/14 - NK: Added location file for Root R. diversion
 ! rev. 9.9.17 Jun. 07/14 - NK: Added check for allocation of outarray in Sub.f
 ! rev. 9.9.18 Jun. 08/14 - NK: Fixed glacier_class check for wetlands
 ! rev. 9.9.19 Jun. 11/14 - NK: Added a file for lat-long diversion locations for L. St. Jo
 ! rev. 9.9.20 Jul. 15/14 - NK: Fix -ve lake storage when release data used
 ! rev. 9.9.20 Jul. 24/14 - NK: Added dead storage for lakes "store_dead"
 ! rev. 9.9.21 Jul. 27/14 - NK: Added allocation for outarray in sub
 ! rev. 9.9.22 Jul. 29/14 - NK: Fixed basin no assignment in flowinit.f
 ! rev. 9.9.23 Aug. 10/14 - NK: Uniform arguments for write_r2c
 ! rev. 9.9.24 Aug. 20/14 - NK: Added monthly mean flow csv file spl_mly_nn.csv
 ! rev. 9.9.25 Sep. 02/14 - NK: Finally fixed the error when nbasin=0
 ! rev. 9.9.26 Sep. 16/14 - NK: Added precip adjust for forecast & fcstflg
 ! rev. 9.9.27 Sep. 18/14 - NK: Added zero class bypass in intcept.f
 ! rev. 9.9.28 Sep. 18/14 - NK: Added 'a' as option for ntrlflg & smrflg
 ! rev. 9.9.29 Sep. 30/14 - NK: Remove unnecessary writes for watroute
 ! rev. 9.9.30 Sep. 30/14 - NK: fixed allocation for qhyd_mly & qsyn_mly
 ! rev. 9.9.31 Oct. 13/14 - NK: Changed flow initialization RE: zero init flows
 ! rev. 9.9.33 Oct. 16/14 - NK: Added checks for files existing for a resume'
 ! rev. 9.9.34 Oct. 17/14 - NK: Added re-compute of lake storage re: new lake levels
 ! rev. 9.9.35 Oct. 20/14 - NK: Added keyword & file checks
 ! rev. 9.9.36 Nov. 03/14 - NK: Revised error message for daily diff choices
 ! rev. 9.9.37 Nov. 05/14 - NK: Added `newDataFlag` check to WATROUTE
 ! rev. 9.9.38 Nov. 12/14 - NK: Added LKdepth to ill file
 ! rev. 9.9.39 Nov. 14/14 - NK: Modifications for watroute
 ! rev. 9.9.40 Nov. 19/14 - NK: Modified the 'a' option for ntrlflg
 ! rev. 9.9.41 Nov. 20/14 - NK: Added check if diversion = in-basin
 ! rev. 9.9.42 Nov. 26/14 - NK: Added error check if diversion does not exist
 ! rev. 9.9.43 Nov. 26/14 - NK: Allocation for divertflg = 'g'
 ! rev. 9.9.44 Nov. 28/14 - NK: Added dead storage to reservoirs
 ! rev. 9.9.45 Dec. 03/14 - NK: Revamped read_pt2 for general use
 ! rev. 9.9.46 Dec. 10/14 - NK: Added check on initial lake outflow
 ! rev. 9.9.47 Dec. 24/14 - NK: Added lakeflg for lake evaporation option
 ! rev. 9.9.48 Jan. 06/15 - NK: Added wetland cond. function for o/b flow
 ! rev. 9.9.49 Jan. 06/15 - NK: Added courantflg
 ! rev. 9.9.50 Jan. 07/15 - NK: Added zero - initial flow warning
 ! rev. 9.9.51 Jan. 13/15 - NK: Added min channel area in flowinit
 ! rev. 9.9.52 Jan. 14/15 - NK: Fixed bug for channel store < 0 for withdrawals

! rev. 9.9.53 Jan. 18/15 - NK: Prevent mode switch during iteration in wetland routing
! rev. 9.9.54 Jan. 19/15 - NK: Put par & shd file names for 1st event in the headers
! rev. 9.9.55 Jan. 22/15 - NK: Added diversion upstream drainage area in div file
! rev. 9.9.56 Feb. 04/15 - NK: Fixed missing initial rel data in read_resv
! rev. 9.9.57 Feb. 08/15 - NK: Fixed resv inflow output resin & lake_sd
! rev. 9.9.58 Feb. 13/15 - NK: Added time column to levels.txt
! rev. 9.9.59 Mar. 06/15 - NK: In route: strloss option frclg y/n
! rev. 9.9.60 Mar. 06/15 - NK: In sub: fixed call write_r2c for close condition
! rev. 9.9.61 Mar. 06/15 - NK: In route: restored hcha2(n)=store2(n)/chaarea(n)
! rev. 9.9.62 Mar. 21/15 - NK: Change zone from character to integer
! rev. 9.9.63 Apr. 06/15 - NK: Changed reas_resv to carry on with lask known release(s)
! rev. 9.9.64 Apr. 08/15 - NK: DDS bypass in sub for single runs
! rev. 9.9.65 Apr. 03/15 - NK: Added rule s/r; resrl\rules.txt & ruleflg
! rev. 9.9.66 Apr. 03/15 - NK: Added options to write_tb0 str files
! rev. 9.9.67 Apr. 29/15 - NK: Deleted mid_file headers in with tbcflg=y
! rev. 9.9.68 Apr. 29/15 - NK: Fixed tto reset with resume
! rev. 9.9.69 Jun. 10/15 - NK: prevent write ro rff if there is no class area
! rev. 9.9.70 Jun. 12/15 - NK: Add del_rain, and dSTRconc2 to the wfo file
! rev. 9.9.71 Jun. 13/15 - NK: DDS obf function taken out of sub > s/r obj_fn
! rev. 9.9.72 Jul. 21/15 - NK: Dave Newson additions to sub & process_rain
! rev. 9.9.73 Aug. 31/15 - NK: Finished rules s/r - ready for beta testing
! rev. 9.9.74 Sep. 11/15 - NK: Added output to unit 53 in flowinit
! rev. 9.9.75 Sep. 11/15 - NK: Added basin_no.r2c output to flowinit.f
! rev. 9.9.76 Sep. 11/15 - NK: Added recorded isotope concentrations
! rev. 9.9.77 Sep. 11/15 - NK: S/r read_ts5 created
! rev. 9.9.78 Sep. 16/15 - NK: Fixed wcl in melt.f
! rev. 10.1.01 Oct. 05/15 - NK: Isotope update: added 2H
! rev. 10.1.02 Oct. 09/15 - NK: Fixed allocation for qhyd_mly & qsyn_mly
! rev. 10.1.03 Oct. 09/15 - NK: Added units 81-83 for isotope output
! rev. 10.1.04 Oct. 10/15 - NK: Added year_last variable for use in reading isotope data
! rev. 10.1.05 Oct. 11/15 - NK: Iso RMS error
! rev. 10.1.06 Nov. 19/15 - NK: Added area_check with can_discharge_sites.xyz
! rev. 10.1.07 Dec. 02/15 - NK: Added ice_fctr(n) to route
! rev. 10.1.08 Dec. 04/15 - NK: Added msg re: replacing "mean_observed_flows.txt"
! rev. 10.1.09 Dec. 07/15 - NK: Add blank line for missing data in the precip.txt file in
lst.f
! rev. 10.1.10 Dec. 09/15 - NK: Add blank line for missing data in the precip.txt file in
lst.f
! rev. 10.1.11 Dec. 11/15 - NK: Revised ice factor initialization and calculation
! rev. 10.1.12 Dec. 12/15 - NK: Added Nash Efficiency nasheff.r2c file unit-66
! REV. 10.1.13 Dec. 28/15 - NK: Rearranged the par file blocks & contents
! REV. 10.1.14 Jan. 05/16 - NK: Added ice rules for Lakes Athabaska & Great Slave.
! REV. 10.1.15 Jan. 08/16 - NK: Custom coding for Mackenzie River Basin Hydraulic Model
! REV. 10.1.16 Jan. 11/16 - NK: Added subroutine ice_factor.f
! REV. 10.1.17 Jan. 11/16 - NK: Added fpetLakeOverride factor
! REV. 10.1.18 Jan. 15/16 - NK: Made opening of the master_inflow file optional with
routeflg=q
! REV. 10.1.19 Jan. 15/16 - NK: Fixed initialization of ice_fctr - moved from lake_ice >
runof6
! REV. 10.1.20 Jan. 15/16 - NK: Fixed initialization of ice_fctr - moved from lake_ice >
runof6
! REV. 10.1.21 Jan. 22/16 - NK: isotope updates
! REV. 10.1.21 Jan. 23/16 - NK: Fixed lake init flow bug in flowinit
! REV. 10.1.22 Jan. 25/16 - NK: Fixed flowinit for partial basins
! REV. 10.1.23 Jan. 28/16 - NK: Added abort when water class not specified
! REV. 10.1.24 Jan. 30/16 - NK: Added qUS1 & qUS2 for watbal
! REV. 10.1.25 Feb. 21/16 - NK: Added nudge_flags.txt
! REV. 10.1.26 Mar. 23/16 - NK: Fixed comment for spinup period
! REV. 10.1.27 Apr. 19/16 - NK: Moved outfiles code in spl9 (below)
! REV. 10.1.28 Apr. 26/16 - NK: Fixed first day of output for master_inflows file
! REV. 10.1.29 May 04/16 - NK: Added parfile comments

! REV. 10.1.30 May 08/16 - NK: Added smoothdist warning in read_par_parser
 ! REV. 10.1.31 May 15/16 - NK: Revised output to precip.txt : include all str stations
 ! REV. 10.1.32 May 18/16 - NK: Separate radinfl for precip & temperature
 ! REV. 10.1.33 Jun 20/16 - NK: Change the time stamp in the watflood.wfo file
 ! REV. 10.1.34 Jul 05/16 - NK: Added Obs. & Model mean flows to wfo file
 ! REV. 10.1.35 Jul 07/16 - NK: Added simulation start time to the wfo file
 ! REV. 10.1.36 Jul 12/16 - NK: Added results\LakeName.tb0
 ! REV. 10.1.37 Jul 28/16 - NK: Added "Ellipsoid to the WFO header
 ! REV. 10.1.38 Jul 28/16 - NK: Added noDataValue to WFO & tb0 files
 ! REV. 10.1.39 Sep 16/16 - NK: Fixed stations outside the watershed for tb0
 ! REV. 10.1.40 Oct 11/16 - NK: Fixed bug in read_divert for missing u/s DA
 ! REV. 10.1.41 Oct 11/16 - NK: Added tb0flg to write lake_*.tb0 files
 ! REV. 10.1.42 Oct 20/16 - NK: Reinstated read_ice_factor.f as default if present
 ! REV. 10.1.43 Oct 21/16 - NK: lake_ice_factor changed from : to :,
 ! rev. 10.1.44 Oct. 22/16 - NK: Reworked icerivflg & icelakeflg
 ! rev. 10.1.45 Oct. 26/16 - NK: Added allocation check for qdivert in rerout
 ! rev. 10.1.46 Nov. 08/16 - TH: Changed B1 - 5 to real*8
 ! rev. 10.1.47 Nov. 08/16 - TH: Major changes in the ISO part of AET.f
 ! rev. 10.1.48 Nov. 08/16 - TH: addet fpet(ii_water) to the wetland evaporation
 ! rev. 10.1.49 Nov. 08/16 - TH: Overhauled lake evaporation
 ! rev. 10.1.50 Nov. 08/16 - TH: Overhauled lst for new isotope output
 ! rev. 10.1.51 Nov. 08/16 - TH: removed unused isotope related calculations, merged two
 ! rev. 10.1.51 TH: isotope related calc sections to reduce if statements
 ! rev. 10.1.52 Nov. 08/16 - NK:
 ! rev. 10.1.53 Nov. 09/16 - NK: Changed levels.txt to levels.csv
 ! rev. 10.1.54 Nov. 25/16 - NK: Moved tdum under call timer in sub
 ! rev. 10.1.55 Nov. 30/16 - NK: Fixed sumf & sumffs in runof6
 ! rev. 10.1.56 Dec. 05/16 - NK: Fixed evt in AET.f to account for sca
 ! rev. 10.1.57 Dec. 06/16 - NK: Added snwNN.txt files for iopt > 0
 ! rev. 10.1.58 Dec. 06/16 - NK: corrected tdum > tdum1 for modelflg=i
 ! rev. 10.1.59 Dec. 18/16 - NK: Fixed missing # channel correction chnl(1-5)
 ! rev. 10.1.60 Jan. 03/17 - NK: Fixed conditional in route
 ! rev. 10.1.61 Jan. 03/17 - NK: Changed results\peaks.txt to write peak flows
 ! rev. 10.1.62 Jan. 08/17 - NK: Checkup on strloss effect on low flows
 ! rev. 10.1.63 Jan. 25/17 - NK: Intel® Parallel Studio XE 2017 Update 1
 ! rev. 10.1.64 Jan. 26/17 - NK: Added XML output file
 ! rev. 10.1.65 Jan. 28/17 - NK: Fixed allocate lake_elv from read_flow
 ! rev. 10.1.66 Jan. 28/17 - NK: Fixed leap year in timer
 ! rev. 10.1.67 Feb. 18/17 - NK: Ignore start year in subsequent event files
 ! rev. 10.1.68 Mar. 03/17 - NK: Made midnight 00 instead of 24
 ! rev. 10.1.69 Mar. 03/17 - NK: Changed allocation for lvl_reach in read_lvl.f
 ! rev. 10.1.70 Mar. 03/17 - NK: Added year_now2 etc. for converting Grib2 files
 ! rev. 10.1.71 Mar. 14/17 - NK: Revised reading mean_observed_flows in sub
 ! rev. 10.1.72 Mar. 20/17 - NK: Fixed bug in sub for error_flag = 4
 ! rev. 10.1.73 Mar. 27/17 - NK: Advisory message set in precip.txt for iopt=0
 ! rev. 10.1.74 Apr. 01/17 - NK: Changed timer to fix 1 day-off problem
 ! rev. 10.1.75 Apr. 03/17 - NK: Fixed time & thr in runof6 arg list
 ! rev. 10.1.76 Apr. 05/17 - NK: Reorganized the outfiles.* file
 ! rev. 10.1.77 Apr. 17/17 - NK: Moved DDS err calcs to new dds_code s/r's
 ! rev. 10.1.78 Apr. 17/17 - NK: New s/r dds_UZS to calculate low flow penalty
 ! rev. 10.1.79 Apr. 18/17 - NK: Set trcflg=0 for all dds except errflg=10
 ! rev. 10.1.80 Apr. 26/17 - NK: Fixed tracer turnoff for -ve resv. storage
 ! rev. 10.1.81 May 05/17 - NK: Added snowg\yyyymmdd_swe.tb0 obs. swe
 ! rev. 10.1.82 May 09/17 - NK: Added reservoir_fudge_factors.csv
 ! rev. 10.1.83 May 09/17 - NK: Fixed lake evap bug - moved it outside lake-only loop
 ! rev. 10.1.84 May 09/17 - NK: Put drng(n,ii)=drng(n,ii)*fraction back into runof6
 ! rev. 10.1.85 May 17/17 - NK: Level_station_location.yyx for iopt > 0 only
 ! rev. 10.1.86 May 17/17 - NK: Diversion_location.yyx for iopt > 0 only
 ! rev. 10.1.87 May 18/17 - NK: Added DA to reservoir_location.xyz
 ! rev. 10.1.88 May 23/17 - NK: Fixed Juliean_day problems for iso R/W
 ! rev. 10.1.89 May 25/17 - NK: Added errflg = 11 for isotope DDS

! rev. 10.1.90 Jul. 27/17 - NK: Added date_now for i/o files
! rev. 10.1.91 May 25/17 - NK: Added errflg = 12 for isotope DDS
! rev. 10.1.92 May 25/17 - NK: Changed to max 200 dds variables
! rev. 10.1.92 Aug 12/17 - NK: delete store_dead in iso s/r's
! rev. 10.1.93 Aug 17/17 - NK: allow year1 etc. to be passed for each event
! rev. 10.1.94 Aug 29/17 - NK: Fixed col check bug in read_lvl
! rev. 10.1.95 Sep 11/17 - NK: Fixed LKdepth bug in sub
! rev. 10.1.96 Sep 11/17 - NK: Added variable lake depth calculation lake_elv()-LKinvert()
! rev. 10.1.97 Sep 11/17 - NK: Moved hdrflg action in runof6.f
! rev. 10.1.98 Oct 04/17 - NK: Deal with -ve flows in route
! rev. 10.1.99 Oct 08/17 - NK: Added error check for # sdc classes in Melt.f
! rev. 10.2.01 Oct 08/17 - NK: Moved ruleflg from sub.f to spl.f
! rev. 10.2.02 Oct 24/17 - NK: Fixed xml output file
! rev. 10.2.03 Oct 28/17 - NK: Revert to old G format for lakeSD.csv
! rev. 10.2.04 Oct 28/17 - NK: Change to one xml output file for computed flow
! rev. 10.2.05 Oct 28/17 - NK: Killed off stats_info.txt for iopt.ge.1
! rev. 10.2.06 Oct 28/17 - NK: wfo_spec.txt in working OR basin directory
! rev. 10.2.07 Nov. 03/17 - NK: New rt_pond subroutine for channel pond routing
! rev. 10.2.08 Nov. 04/17 - NK: New rt_channel & rt_wetland subroutines
! rev. 10.2.09 Nov. 04/17 - NK: Reinstated old Manning's n correction for legacy files