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| **In FVCOM40\_source:** | |
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| **New added(6):** | |
| mod\_cstms\_vars.F | Module of the Community Sediment Transport Modeling System with cohesive model |
| mod\_flocmod.F | Module of the Community Sediment Transport Modeling System with cohesive model |
| mod\_fluid\_mud.F | Module of the 2-D fluid mud at bed-water interface |
| mod\_sed\_cstms.F | Module of the Community Sediment Transport Modeling System with cohesive model |
| mod\_sparse\_timeseries.F | Module for wave watershed partition sparse time series output |
| w3part.F | Interface to watershed partitioning routines |
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| **Modified (58):** | |
| adv\_s.F | Added backward tracer advection schemes |
| adv\_t.F | Added backward tracer advection schemes |
| bcond\_gcn.F | 1.Added RUNGE-KUTTA integration stages  2.Added GOTM choice for offline sediment and offline biology |
| bcond\_gcy.F | Added RUNGE-KUTTA integration stages |
| cell\_area.F | Fixed the warnings of format in compilation |
| cntrl\_prmtrs.F | BOTTOM\_ROUGHNESS\_LENGTHSCALE = -1.0\_SP => BOTTOM\_ROUGHNESS\_LENGTHSCALE = BOTTOM\_ROUGHNESS\_LENGTH |
| external\_step.F | Added RUNGE-KUTTA integration stages |
| fvcom.F | 1.Changed CALL BCOND\_GCN(8) => CALL BCOND\_GCN(8,0)  2.Added code for Community Sediment Transport Modeling System with cohesive model  3.Added code for wave watershed partition time series output  4.For general biological model, changed CALL GET\_PARAMETER => CALL GET\_PARAMETER\_NEW  5.Fixed a bug ---- moving CALL GET\_OUTPUT\_FILE\_INTERVAL from mod\_station\_timeseries.F to here |
| grid\_metrics.F | Added code for wave watershed partition time series output |
| init\_sed.F | Added code for Community Sediment Transport Modeling System with cohesive model |
| internal\_step.F | 1.Changed CALL BCOND\_GCN(\*) => CALL BCOND\_GCN(\*,0)  2.Changed CALL BCOND\_GCY(\*) => CALL BCOND\_GCY(\*,0)  3.Added backward tracer advection schemes  4.Modified offline sediment code  5.Added offline biological code  6.Added code for sediment when turning on data assimilation |
| makefile | Six new files were added in FVCOM: mod\_cstms\_vars.F,mod\_flocmod.F,mod\_sed\_cstms.F,mod\_fluid\_mud.F,mod\_sparse\_timeseries.F,w3part.F |
| make.inc\_example | 1.Added -DORIG\_SED and -DCSTMS\_SED to FLAG\_211, -DFLUID\_MUD to FLAG\_43 and -DOFFLINE\_BIOLOGY to FLAG\_251  2.Modified 'DEF\_FLAGS = -P -C -traditional' as 'DEF\_FLAGS = -P -traditional' |
| mod\_action\_ex.F | 1.Modified code to realize vector operation for wave model  2.Fixed a type bug: REAL IDP1 => INTEGER IDP1  3.Added code for high latitude wave  4.Added code for the ice-induced wave attenuation |
| mod\_action\_im.F | Fixed a type bug: REAL IDP1 => INTEGER IDP1 |
| mod\_assim.F | Added code for sediment model |
| mod\_bbl.F | 1.Updated by J.Ge  2.Added the code for the Community Sediment Transport Modeling System with cohesive model (CSTMS\_SED) |
| mod\_bio\_3D.F | 1.Added subroutine BIO\_PARAMETER\_REPORT  2.Modified subroutine BIO\_INITIAL |
| mod\_dam.F | Removed the variables DAM1\_SPONGE\_GL and DAM2\_SPONGE\_GL from READ |
| mod\_dye.F | Fixed a bug: moving real time conversion from subroutine NAME\_LIST\_READ\_DYE to subroutine ALLOC\_VARS\_DYE |
| mod\_force.F | 1.Separated wind stress pointers for wave model from that for current model  2.Added offline sediment variables  3.Added offline biological variables and subroutines  4.Fixed problems for Intel FORTRAN version 15 and above: added forcing variable pointers initialization  5.Changed subroutine name GET\_VAL to GET\_VALUE  6.Code updated for offline sediment |
| mod\_heatflux.F | Added intrinsic function DMAX1 and DMIN1 for double precision |
| mod\_heatflux\_gl.F | Added intrinsic function DMAX1 and DMIN1 for double precision |
| mod\_input.F | 1.Added variable initialization for the backward tracer advection schemes  2.Added variable initialization and reading for off-line biological model  3.In subroutine LOAD\_GRID\_TYPE, added read h,h1,zz,zz1 from NETCDF input file  4.Added two lines of variable TEST initialization: TEST=item(2),TEST=item(3)  5.Fixed a bug: EQ\_BETA(I) = READ\_FLOAT(item(3), IOS) => EQ\_BETA(I)=READ\_FLOAT(item(4), IOS)  6.Added logical variable HIGH\_LATITUDE\_WAVE initialization |
| mod\_interp.F | Fixed a bug: REAL(SP),POINTER,INTENT(OUT) :: Zout(:) => REAL(SP),POINTER,INTENT(INOUT) :: Zout(:) |
| mod\_lag.F | Fixed a bug: COS(p%v%xn(2)) => COSD(p%v%xn(2)) |
| mod\_main.F | 1.Added variables for the backward tracer advection schemes  2.Added variables for off-line biological model  3.Added logical variable HIGH\_LATITUDE\_WAVE in namelist NML\_ADDITIONAL\_MODELS |
| mod\_main\_wave.F | 1.Moved character variable COMPUT here  2.Added variables for wave watershed partition sparse time series output |
| mod\_ncdio.F | 1.Added code for the Community Sediment Transport Modeling System with cohesive model (CSTMS\_SED)  2.Added code for the 2-D fluid mud at bed-water interface  3.Fixed the error for NCAV\_ON |
| mod\_nctools.F | Added variable initialization status=1 |
| mod\_nesting.F | Updated the new code for vertical interpolation from large domain to small domain |
| mod\_newinp.F | Added interface GET\_VAL\_ARRAY |
| mod\_non\_hydro.F | Changed CALL BCOND\_GCN(3) => CALL BCOND\_GCN(3,0) |
| mod\_northpole.F | Added subroutine ADV\_N\_XY for wave advection at the north pole |
| mod\_obcs.F | Added RUNGE-KUTTA integration stages |
| mod\_probe.F | Modified only for SEDIMENT part |
| mod\_scal.F | 1.Added backward tracer advection schemes  2.Added horizontal flux limitation for scalar (only used for xy coordinates. For spherical coordinate, it is very slow if turn this part on) |
| mod\_sed.F | 1.This module is only for original sediment model(the sediment transport model developed by Geoffey Cowles in v3.1-v3.2) and updated by J.Ge  2.Added the 2-D fluid mud at bed-water interface |
| mod\_semi\_implicit.F | Fixed a bug of data exchange |
| mod\_set\_time.F | 1.Fixed a bug for netcdf averaged variables output by David  2.CALL GET\_VAL => CALL GET\_VALUE |
| mod\_setup.F | 1.Set XG,YG,XCG,YCG only for data assimilation  2.Fixed a bug: MPI\_REAL => MPI\_F |
| mod\_sng.F | Fixed the warnings of format in compilation |
| mod\_startup.F | 1.Added code for the Community Sediment Transport Modeling System with cohesive model  2.Added code for the backward tracer advection schemes  3.Added new subroutine to read initial bio-variables from NETCDF input file  4.Fixed a bug: CALL NC\_CONNECT\_AVAR(VAR, ISWETC) => CALL NC\_CONNECT\_AVAR(VAR, ISWETCE) for 'LOAD ISWETCE' |
| mod\_station\_timeseries.F | 1.Added OUT\_WAVE\_PARTITION to output station time series of wave watershed partition variables  2.Fixed a bug ---- moving CALL GET\_OUTPUT\_FILE\_INTERVAL to file fvcom.F  3.Changed the attitude of 'time' for NETCDF output  4.Fixed a bug ---- now can output longitude and latitude in NETCDF output  5.# if defined (WAVE\_CURRENT\_INTERACTION) => # if defined (WAVE\_CURRENT\_INTERACTION) && !defined (WAVE\_OFFLINE) |
| mod\_types.F | Added H1, Z1,ZZ1 to type GRID for nesting |
| mod\_utils.F | 1.Renamed subroutine GET\_VAL as GET\_VALUE. 2.Added function SCAN\_FILE3 -- J.Ge |
| mod\_wave\_current\_interaction.F | Added variable allocation and initialization for wave watershed partition sparse time series output |
| mod\_wd.F | Fixed a bug of exchange the wet/dry information for elements between CPUs |
| namelist.F | Added code for namelist NML\_WAVE\_SPARSE\_TIMESERIES |
| rho\_pmean.F | 1.Added code for wetting/drying  2.Fixed a bug: MPI\_REAL => MPI\_F |
| swancom1.F | Fixed the warnings of format in compilation |
| swancom5.F | 1.Added subroutine SPROXY2 for the vector operation of wave model(explicit scheme only)  2.Added subroutine SPROXY3 for high latitude wave (explicit scheme only) |
| swanmain.F | Moved character variable COMPUT to mod\_main\_wave.F |
| swanpre1.F | 1.Moved character variable COMPUT to mod\_main\_wave.F  2.Added: IF(ISONB\_W(I)==3) ISONB\_W(I)=0 (line 945) |
| swanser.F | 1.Added new subroutine KSCIP2 for the vector operation of wave model(explicit scheme only)  2.Added code for wave watershed partition variable calculation |
| tge.F | Line 293: ALLOCATE(NB\_TMP(M,MX\_NBR\_ELEM+1)) => ALLOCATE(NB\_TMP(MX\_NBR\_ELEM+1,2)) ---- found by Karsten Lettmann |
| vdif\_q.F | 1.Line 186: # if defined (WAVE\_CURRENT\_INTERACTION) => # if defined (WAVE\_CURRENT\_INTERACTION) && !defined (WAVE\_OFFLINE)  2.In formula solving the GH, fixed a bug: MT => M |
| vdif\_ts.F | If net heat flux is cooling and SST is at freezing point or below then suppress further cooling |
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| **In BIO\_source:** | |
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| **New added (4):** | |
| bio\_model\_new.in | Example of new format of input file |
| mod\_bioinp.F | Decompose input line into variable names and variable values. |
| mod\_newinp2.F | Module Input\_Util2 for new format of input |
| mod\_utils2.F | Module Mod\_utils2 for new format of input |
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| **Modified (9):** | |
| detritus.F | 1.Changed the formula of D\_SINK on layers of KBVM1 and KBV  2.Added a line for BIO\_D at the bottom layer KBV  3.Changed the type of variables DELTA\_DMIN, W\_D1, SOURCE and TEMPP from REAL(SPP) to REAL(DPP) |
| get\_parameter.F | Added new subroutine GET\_PARAMETER\_NEW. Only this subroutine is used for new code |
| makefile | Three new files were included: mod\_utils2.F, mod\_bioinp.F and mod\_newinp2.F |
| mod\_1D.F | Added SPP definition for double precision |
| mod\_detritus.F | Changed the type of variables DETRITE, D\_SINK and D\_SINK1 from REAL(SPP) to REAL(DPP) |
| mod\_phytoplankton.F | Changed the type of variables FVP, W\_P and WSNK\_P from REAL(SPP) to REAL(DPP) |
| nutrient.F | For nutrient source and sinks, added bentihc remineralization |
| phytoplankton.F | 1.Added light function choice cases: SH92\_LIGHT and JI\_LIGHT  2.Some ULR formulas were changed  3.Fixed a bug: KSN(J,I1) => KSN(I1,J)  4.The formulas of UPTAKE\_PN, P\_D, WSNK\_P were changed |
| zooplankton.F | 1.Added zooplankton grazing case: DM\_G  2.Changed the formula of G\_RATE for case IVLE1\_G |