WW3 v6.05 – 20 Juin 2018

- namelist -

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Code compilation

model/bin

- **w3_setenv** : automatic environment setup in model/bin/wwatch3.env
- **w3_automake** : automatic compilation SHRD / MPI / OMP / HYB

  → merge of w3_make & make_MPI, make_OMP, make_HYB

TODO

- Parallel compilation of w3_automake
- A unique comp and link template file with a namelist file to activate each system configuration

namelist implementation

Done

ww3_prnc ww3_bounc

ww3_shel ww3_multi

ww3_ounf ww3_ounp ww3_trnc

In progress

ww3_grid

Todo

ww3_prep ww3_bound ww3_prtide ww3_strt

ww3_outf ww3_outp ww3_trck ww3_gint

ww3_grib ww3_gspl ww3_systrk ww3_uprstr gx_outf gx_outp

inp to nml converter

model/aux/bash

- ww3_multi_inp2nml.sh
- ww3_ounp_inp2nml.sh
- ww3_shel_inp2nml.sh
- ww3_bounc_inp2nml.sh
- ww3_ounf_inp2nml.sh
- ww3_prnc_inp2nml.sh
- ww3_trnc_inp2nml.sh

-
```
./loop_nml.sh    $WW3/regtests   ww3_ounf
```

nml or inp

For general run :

- By default use **nml** file
- Otherwise use inp file

For regtests run :

- By default use **inp** file
- Option -N to use nml file

New fortran programs

model/ftn

- w3nmlbouncmd.ftn
- w3nmlprncmd.ftn

- w3nmlshelmd.ftn
- w3nmlmultimd.ftn

- w3nmlounpmd.ftn
- w3nmlounfmd.ftn
- w3nmltrncmd.ftn

Content of w3nmlounf.ftn

model/ftn/w3nmlounf.ftn

- Subroutine W3NMLOUNF
  - Call READ_FIELD_NML
  - !/T Call REPORT_FIELD_NML
  - Call READ_FILE_NML
  - !/T Call REPORT_FILE_NML

- Subroutine READ_FIELD_NML
  - Set default variables values
  - Read the user defined values from nml file

- Subroutine REPORT_FIELD_NML
  - Write on screen all the values (default and user defined)

TODO : create an output file with all the namelists values per program

Content of ww3_ounf.nml

model/nml/ww3_ounf.nml

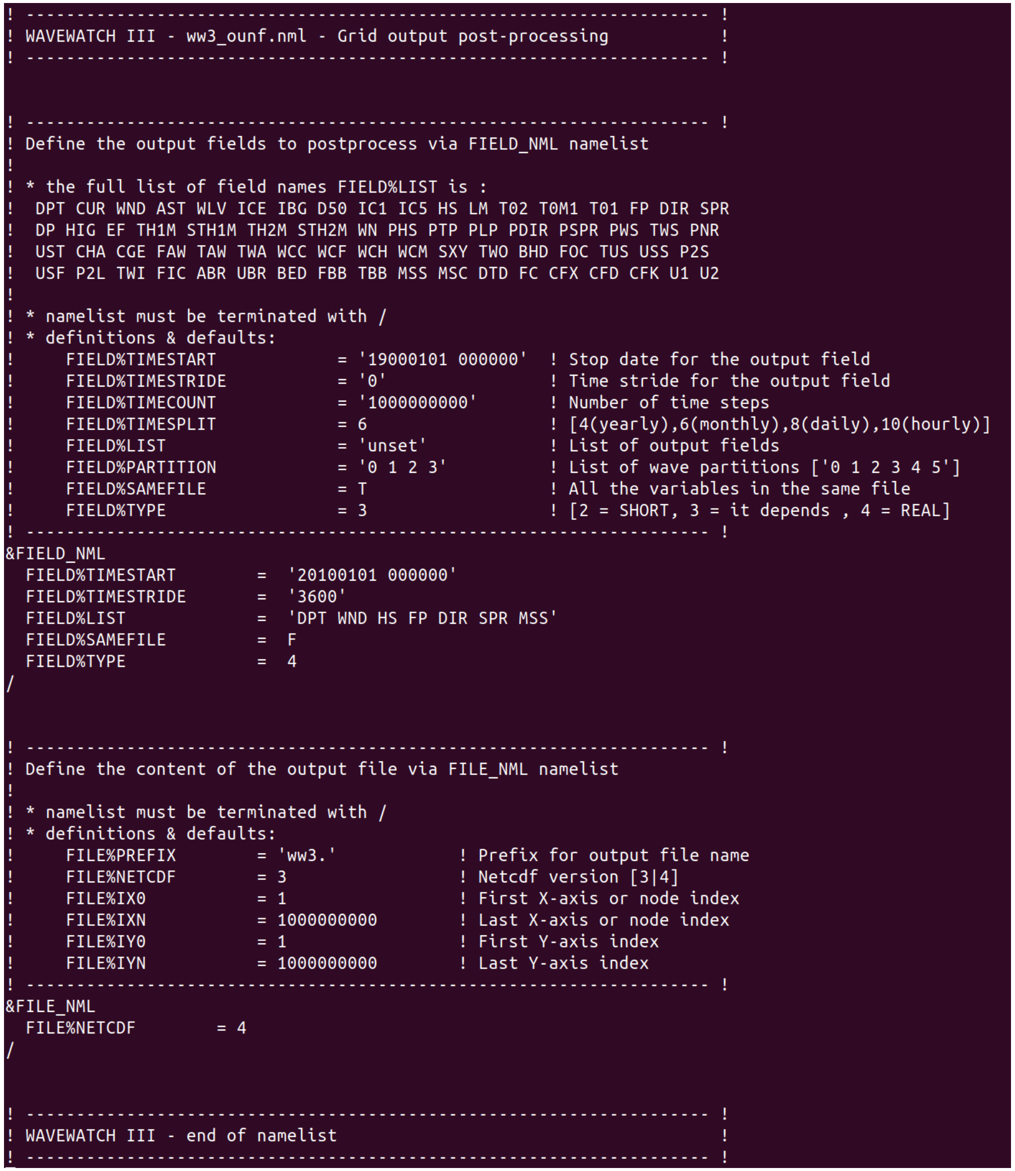
divided by sections

default values in comment

some values must be set

External files :

- spec.list for bounc
- point.list for shel & multi
- namelists.nml for grid



```
! --------------------------------------------------------------------- !
! WAVEWATCH III - ww3_ounf.nml - Grid output post-processing            !
! --------------------------------------------------------------------- !


! --------------------------------------------------------------------- !
! Define the output fields to postprocess via FIELD_NML namelist
!
! * the full list of field names FIELD%LIST is :
!  DPT CUR WND AST WLV ICE IBG D50 IC1 IC5 HS LM T02 T0M1 T01 FP DIR SPR
!  DP HIG EF TH1M STH1M TH2M STH2M WN PHS PTP PLP PDIR PSPR PWS TWS PNR
!  UST CHA CGE FAW TAW TWA WCC WCF WCH WCM SXY TWO BHD FOC TUS USS P2S
!  USF P2L TWI FIC ABR UBR BED FBB TBB MSS MSC DTD FC CFX CFD CFK U1 U2
!
! * namelist must be terminated with /
! * definitions & defaults:
!     FIELD%TIMESTART            = '19000101 000000'  ! Stop date for the output field
!     FIELD%TIMESTRIDE           = '0'                ! Time stride for the output field
!     FIELD%TIMECOUNT            = '1000000000'       ! Number of time steps
!     FIELD%TIMESPLIT            = 6                  ! [4(yearly),6(monthly),8(daily),10(hourly)]
!     FIELD%LIST                 = 'unset'            ! List of output fields
!     FIELD%PARTITION            = '0 1 2 3'          ! List of wave partitions ['0 1 2 3 4 5']
!     FIELD%SAMEFILE             = T                  ! All the variables in the same file
!     FIELD%TYPE                 = 3                  ! [2 = SHORT, 3 = it depends , 4 = REAL]
! --------------------------------------------------------------------- !
&FIELD_NML
  FIELD%TIMESTART        =  '20100101 000000'
  FIELD%TIMESTRIDE       =  '3600'
  FIELD%LIST             =  'DPT WND HS FP DIR SPR MSS'
  FIELD%SAMEFILE         =  F
  FIELD%TYPE             =  4
/


! --------------------------------------------------------------------- !
! Define the content of the output file via FILE_NML namelist
!
! * namelist must be terminated with /
! * definitions & defaults:
!     FILE%PREFIX        = 'ww3.'            ! Prefix for output file name
!     FILE%NETCDF        = 3                 ! Netcdf version [3|4]
!     FILE%IX0           = 1                 ! First X-axis or node index
!     FILE%IXN           = 1000000000        ! Last X-axis or node index
!     FILE%IY0           = 1                 ! First Y-axis index
!     FILE%IYN           = 1000000000        ! Last Y-axis index
! --------------------------------------------------------------------- !
&FILE_NML
  FILE%NETCDF        = 4
/


! --------------------------------------------------------------------- !
! WAVEWATCH III - end of namelist                                       !
! --------------------------------------------------------------------- !
```

Content of ww3_grid.nml

```
! -------------------------------------------------------------------- !
! Define the spectrum parameterization via SPECTRUM_NML namelist
!
! * namelist must be terminated with /
! * definitions & defaults:
!     SPECTRUM%XFR         = 0            ! frequency increment
!     SPECTRUM%FREQ1       = 0            ! first frequency (Hz)
!     SPECTRUM%NK          = 0            ! number of frequencies (wavenumbers)
!     SPECTRUM%NTH         = 0            ! number of direction bins
!     SPECTRUM%THOFF       = 0            ! relative offset of first direction [-0.5,0.5]
! -------------------------------------------------------------------- !

! -------------------------------------------------------------------- !
! Define the run parameterization via RUN_NML namelist
!
! * namelist must be terminated with /
! * definitions & defaults:
!     RUN%FLDRY            = F            ! dry run (I/O only, no calculation)
!     RUN%FLCX             = F            ! x-component of propagation
!     RUN%FLCY             = F            ! y-component of propagation
!     RUN%FLCTH            = F            ! direction shift
!     RUN%FLCK             = F            ! wavenumber shift
!     RUN%FLSOU            = F            ! source terms
! -------------------------------------------------------------------- !

! -------------------------------------------------------------------- !
! Define the timesteps parameterization via TIMESTEPS_NML namelist
!
! * namelist must be terminated with /
! * definitions & defaults:
!     TIMESTEPS%DTMAX      = 0            ! maximum global time step (s)
!     TIMESTEPS%DTXY       = 0            ! maximum CFL time step for x-y (s)
!     TIMESTEPS%DTKTH      = 0            ! maximum CFL time step for k-th (s)
!     TIMESTEPS%DTMIN      = 0            ! minimum source term time step (s)
! -------------------------------------------------------------------- !
! -------------------------------------------------------------------- !
! Define the grid to preprocess via GRID_NML namelist
!
! * the tunable parameters for source terms, propagation schemes, and
!    numerics are read using namelists.
! * Any namelist found in the folowing sections is temporarily written
!   to param.scratch, and read from there if necessary.
! * The order of the namelists is immaterial.
! * Namelists not needed for the given switch settings will be skipped
!   automatically
!
! * grid type can be :
!    'RECT' : rectilinear
!    'CURV' : curvilinear
!    'UNST' : unstructured (triangle-based)
!
! * coordinate system can be :
!    'SPHE' : Spherical (degrees)
!    'CART' : Cartesian (meters)
!
! * grid closure can only be applied in spherical coordinates
!
! * grid closure can be :
!    'NONE' : No closure is applied
!    'SMPL' : Simple grid closure. Grid is periodic in the
!           : i-index and wraps at i=NX+1. In other words,
!           : (NX+1,J) => (1,J). A grid with simple closure
!           : may be rectilinear or curvilinear.
!    'TRPL' : Tripole grid closure : Grid is periodic in the
!           : i-index and wraps at i=NX+1 and has closure at
!           : j=NY+1. In other words, (NX+1,J<=NY) => (1,J)
!           : and (I,NY+1) => (NX-I+1,NY). Tripole
!           : grid closure requires that NX be even. A grid
!           : with tripole closure must be curvilinear.
!
```

```
!
! * The coastline limit depth is the value which distinguish the sea
!   points to the land points. All the points with depth values (ZBIN)
!   greater than this limit (ZLIM) will be considered as excluded points
!   and will never be wet points, even if the water level grows over.
!   It can only overwrite the status of a sea point to a land point.
!   The value must have a negative value under the mean sea level
!
! * The minimum water depth allowed to compute the model is the absolute
!   depth value (DMIN) used in the model if the input depth is lower to
!   avoid the model to blow up.
!
! * namelist must be terminated with /
! * definitions & defaults:
!     GRID%NAME         = 'unset'           ! grid name (30 char)
!     GRID%NML          = 'namelists.nml'   ! namelists filename
!     GRID%TYPE         = 'unset'           ! grid type
!     GRID%COORD        = 'unset'           ! coordinate system
!     GRID%CLOS         = 'unset'           ! grid closure
!
!     GRID%ZLIM         = 0.        ! coastline limit depth (m)
!     GRID%DMIN         = 0.        ! abs minimum water depth (m)
! -------------------------------------------------------------------- !
! ---------------------------------------------------------------------- !
! Define the rectilinear grid to preprocess via RECT_NML namelist
! - only for RECT grids -
!
! * The minimum grid size is 3x3.
!
! * If CSTRG='SMPL', then SX is forced to 360/NX.
!
! * value <= value_read / scale_fac
!
! * namelist must be terminated with /
! * definitions & defaults:
!     RECT%NX               = 0        ! number of points along x-axis
!     RECT%NY               = 0        ! number of points along y-axis
!
!     RECT%SX               = 0.       ! grid increment along x-axis
!     RECT%SY               = 0.       ! grid increment along y-axis
!     RECT%SF               = 1.       ! scaling division factor for x-y axis
!
!     RECT%X0               = 0.       ! x-coordinate of lower-left corner (deg)
!     RECT%Y0               = 0.       ! y-coordinate of lower-left corner (deg)
!     RECT%SF0              = 1.       ! scaling division factor for x0,y0 coord
! ---------------------------------------------------------------------- !
! -------------------------------------------------------------------- !
! Define the curvilinear grid to preprocess via CURV_NML namelist
! - only for CURV grids -
!
! * The minimum grid size is 3x3.
!
! * If CSTRG='SMPL', then SX is forced to 360/NX.
!
! * value <= scale_fac * value_read + add_offset
!
! * IDLA : Layout indicator :
!                  1   : Read line-by-line bottom to top.
!                  2   : Like 1, single read statement.
!                  3   : Read line-by-line top to bottom.
!                  4   : Like 3, single read statement.
! * IDFM : format indicator :
!                  1   : Free format.
!                  2   : Fixed format with above format descriptor.
!                  3   : Unformatted.
! * FROM : file type parameter
!               'UNIT' : open file by unit number only.
!               'NAME' : open file by name and assign to unit.
!
! * If the file unit number equals 10, then the data is read from this
!   file. The data must follow the above record. No comment lines are
!   allowed within the data input.
!
! * namelist must be terminated with /
! * definitions & defaults:
!     CURV%NX               = 0        ! number of points along x-axis
!     CURV%NY               = 0        ! number of points along y-axis
!
!     CURV%X%SF             = 1.       ! x-coord scale factor
!     CURV%X%OFF            = 0.       ! x-coord add offset
!     CURV%X%FILENAME       = 'unset'  ! x-coord filename
!     CURV%X%IDF            = 0        ! x-coord file unit number
!     CURV%X%IDLA           = 0        ! x-coord layout indicator
!     CURV%X%IDFM           = 0        ! x-coord format indicator
!     CURV%X%FORMAT         = 0        ! x-coord formatted read format
!     CURV%X%FROM           = 0        ! x-coord file type parameter
!
!     CURV%Y%SF             = 1.       ! y-coord scale factor
!     CURV%Y%OFF            = 0.       ! y-coord add offset
!     CURV%Y%FILENAME       = 'unset'  ! y-coord filename
!     CURV%Y%IDF            = 0        ! y-coord file unit number
!     CURV%Y%IDLA           = 0        ! y-coord layout indicator
!     CURV%Y%IDFM           = 0        ! y-coord format indicator
!     CURV%Y%FORMAT         = 0        ! y-coord formatted read format
!     CURV%Y%FROM           = 0        ! y-coord file type parameter
! -------------------------------------------------------------------- !
! -------------------------------------------------------------------- !
! Define the spherical multi-cell grid to preprocess via SMC_NML namelist
! - only for RECT grids -
!
! * The minimum grid size is 3x3.
!
! * If CSTRG='SMPL', then SX is forced to 360/NX.
!
! * value <= value_read / scale_fac
!
! * namelist must be terminated with /
! * definitions & defaults:
!     SMC%NX           = 0       ! number of points along x-axis
!     SMC%NY           = 0       ! number of points along y-axis
!
!     SMC%SX           = 0.      ! grid increment along x-axis
!     SMC%SY           = 0.      ! grid increment along y-axis
!     SMC%SF           = 1.      ! scaling division factor for x-y axis
!
!     SMC%X0           = 0.      ! x-coordinate of lower-left corner (deg)
!     SMC%Y0           = 0.      ! y-coordinate of lower-left corner (deg)
!     SMC%SF0          = 1.      ! scaling division factor for x0,y0 coord
! -------------------------------------------------------------------- !
```

TO ADD :

```
$ SMC cell and face arrays and obstruction ratio:
$  32  1  1  '(....)'  'S6125MCels.dat'
$  33  1  1  '(....)'  'S6125ISide.dat'
$  34  1  1  '(....)'  'S6125JSide.dat'
$  31  1.0  1  1 '(...)' 'NAME'  'SMC25Subtr.dat'
$ The input boundary cell file is only needed when NBISMC > 0.
$  35  1  1  '(....)'  'S6125Bundy.dat'
$ Extra cell and face arrays for Arctic part if ARC is selected.
$  36  1  1  '(....)'  'S6125MBArc.dat'
$  37  1  1  '(....)'  'S6125AISid.dat'
$  38  1  1  '(....)'  'S6125AJSid.dat'
```

```
! -------------------------------------------------------------------- !
! Define the unstructured grid to preprocess via UNST_NML namelist
! - only for UNST grids -
!
! * The minimum grid size is 3x3.
!
! * &MISC namelist must be removed
!
! * The depth value must have negative values under the mean sea level
! * The map value must be set as :
!    -2 : Excluded boundary point (covered by ice)
!    -1 : Excluded sea point (covered by ice)
!     0 : Excluded land point
!     1 : Sea point
!     2 : Active boundary point
!     3 : Excluded grid point
!     7 : Ice point
!
! * the file must be a GMESH grid file containing node and element lists.
!
! * namelist must be terminated with /
! * definitions & defaults:
!     UNST%SF             = 1.       ! scale factor
!     UNST%FILENAME       = 'unset'  ! filename
! -------------------------------------------------------------------- !
! ----------------------------------------------------------------- !
! Define the depth to preprocess via DEPTH_NML namelist
! - for RECT, CURV grids -
!
! * if no obstruction subgrid, need to set &MISC FLAGTR = 0
!
! * The depth value must have negative values under the mean sea level
!
! * value <= value_read * scale_fac
!
! * IDLA : Layout indicator :
!                  1   : Read line-by-line bottom to top.
!                  2   : Like 1, single read statement.
!                  3   : Read line-by-line top to bottom.
!                  4   : Like 3, single read statement.
! * IDFM : format indicator :
!                  1   : Free format.
!                  2   : Fixed format with above format descriptor.
!                  3   : Unformatted.
! * FROM : file type parameter
!               'UNIT' : open file by unit number only.
!               'NAME' : open file by name and assign to unit.
!
! * Example :
!      IDF  SF     IDLA  IDFM  FORMAT    FROM    FILENAME
!      21   0.001  1     1     '(....)'  'NAME'  'GLOB-30M.bot'
!
! * If the file unit number equals 10, then the data is read from this
!   file. The data must follow the above record. No comment lines are
!   allowed within the data input.
!
! * namelist must be terminated with /
! * definitions & defaults:
!     DEPTH%SF             = 0.       ! scale factor
!     DEPTH%FILENAME       = 'unset'  ! filename
!     DEPTH%IDF            = 0        ! file unit number
!     DEPTH%IDLA           = 0        ! layout indicator
!     DEPTH%IDFM           = 0        ! format indicator
!     DEPTH%FORMAT         = 'unset'  ! formatted read format
!     DEPTH%FROM           = 'unset'  ! file type parameter
! ----------------------------------------------------------------- !
```

SAME TEMPLATE FOR MAP, OBST, SLOPE, SED

HOW TO MANAGE ARRAYS DEFINED IN INP FILES ? with 2D array in the namelist file : like bot = 3*(3*1) or   bot = (1, 1, 3) (1, 1, 1) (1, 1, 1)

```
! -------------------------------------------------------------------- !
! Define the input boundary points via INBND_COUNT_NML and
!                                       INBND_POINT_NML namelist
!
! - for RECT, CURV and UNST grids -
! - only if not already defined in MAP_NML namelist or GMESH file -
!
! * If the actual input data is not defined in the actual wave model run
!   the initial conditions will be applied as constant boundary conditions.
!
! * the number of input boundary points is defined by INBND_COUNT
! * The input bounday points must start from index 1 to N
!
! * Each line contains:
!     Discrete grid counters (IX,IY) of the active point and a
!     connect flag. If this flag is true, and the present and previous
!     point are on a grid line or diagonal, all intermediate points
!     are also defined as boundary points.
!
! * Included point :
!     grid points from segment data ( FROM = PART )
!     Defines as lines identifying points at which
!     input boundary conditions are to be defined.
!
! * namelist must be terminated with /
! * definitions & defaults:
!     INBND_COUNT%N_POINT     = 0        ! number of segments
!
!     INBND_POINT(I)%X_INDEX  = 0        ! x index included point
!     INBND_POINT(I)%Y_INDEX  = 0        ! y index included point
!     INBND_POINT(I)%CONNECT  = F        ! connect flag
!
! OR
!     INBND_POINT(I)          = 0 0 F    ! included point
! -------------------------------------------------------------------- !
! ------------------------------------------------------------------- !
! Define the excluded points and bodies via EXCL_COUNT_NML, EXCL_POINT_NML
!                                       and EXCL_BODY_NML namelist
! - only for RECT and CURV grids -
! - only if not already defined in MAP_NML namelist -
!
! * Each line contains:
!     Discrete grid counters (IX,IY) of the active point and a
!     connect flag. If this flag is true, and the present and previous
!     point are on a grid line or diagonal, all intermediate points
!     are also defined as boundary points.
!
! * Excluded point :
!     grid points from segment data ( FROM != PART )
!     Defined as lines identifying points at which
!     input boundary conditions are to be excluded.
!
! * Excluded body:
!     Define a point in a closed body of sea points to remove the
!     entire body of sea points.
!
! * namelist must be terminated with /
! * definitions & defaults:
!     EXCL_COUNT%N_POINT      = 0        ! number of segments
!     EXCL_COUNT%N_BODY       = 0        ! number of bodies
!
!     EXCL_POINT(J)%X_INDEX   = 0        ! x index excluded point
!     EXCL_POINT(J)%Y_INDEX   = 0        ! y index excluded point
!     EXCL_POINT(J)%CONNECT   = F        ! connect flag
!
!     EXCL_BODY(K)%X_INDEX    = 0        ! x index excluded body
!     EXCL_BODY(K)%Y_INDEX    = 0        ! y index excluded body
! OR
!     EXCL_POINT(J)           = 0 0 F    ! excluded point
!     EXCL_BODY(K)            = 0 0      ! excluded body
! ------------------------------------------------------------------- !
! -------------------------------------------------------------------- !
! Define the output boundary points via OUTBND_COUNT_NML and
!                                       OUTBND_LINE_NML namelist
! - only for RECT and CURV grids -
!
! * It will creates a nest file with output boundaries for a inner grid.
!   The prefered way to do it is to use ww3_bounc program.
!
! * These do not need to be defined for data transfer between grids in
!    the multi grid driver.
!
! * the number of output boundary lines is defined by OUTBND_COUNT
! * The output boundary lines must start from index 1 to N
!
! * Output boundary points are defined as a number of straight lines,
!   defined by its starting point (X0,Y0), increments (DX,DY) and number
!   of points. A negative number of points starts a new output file.
!
! * Example for spherical grid in degrees :
!     '1.75  1.50  0.25 -0.10     3'
!     '2.25  1.50 -0.10  0.00    -6'
!     '0.10  0.10  0.10  0.00   -10'
!
! * namelist must be terminated with /
! * definitions & defaults:
!     OUTBND_COUNT%N_LINE   = 0               ! number of lines
!
!     OUTBND_LINE(I)%X0     = 0.              ! x index start point
!     OUTBND_LINE(I)%Y0     = 0.              ! y index start point
!     OUTBND_LINE(I)%DX     = 0.              ! x-along increment
!     OUTBND_LINE(I)%DY     = 0.              ! y-along increment
!     OUTBND_LINE(I)%NP     = 0               ! number of points
! OR
!     OUTBND_LINE(I)        = 0. 0. 0. 0. 0   ! included lines
! -------------------------------------------------------------------- !
```