ROMSPath Manual

Version 1.0

Installation and compilation:

Download all file from the git repository to a local directory.

-bash-4.2$ git clone https://github.com/imcslatte/ROMSPath.git

Edit the file makefile as necessary.

There are some CPP flags that con be set, if you want to use wetting and drying, stokes drift, or larval growth. Set the following variable at the beginning of the makefile. Generally you will not set these.

CPPFLAGS = -DGROWTH -DWETDRY -DSTOKES   
  
Set the flag for the desired compiler. ifort,gfortran, or pgf90. nf-config will need to be installed.

IFORT:=

GFORTRAN := on

PGI :=  
  
Once these are set and you have verified you have nc-config installed.

-bash-4.2$ make   
  
The file ROMSPath.exe should be generated. To run it:

-bash-4.2$ ROMSPath.exe ROMSPath.data  
  
Read the next section before running:

ROMSPath.data settings

Simply edit ROMSPath.data with the desired settings. A list of the parameters and descriptions follows.

**Number of particles:**

numpar: This is the number of particles to simulate. It has to be equal to or less than the number of lines in the file specified in parfile.

**Time parameter’s:**

days: Number of days to run the model.

iprint : Print interval for ROMSPath output in seconds; 3600 = every hour

dt : External time step in seconds (duration between hydro model predictions) . The time step of the ROMS output files you are using.

idt: Internal (particle tracking) time step in seconds. ROMSPath time step. If in doubt set to 60 or lower.

**Hydrodynamic paramters:**

readZeta: .TRUE/.FALSE. If .TRUE. read in sea-surface height (zeta) from NetCDF file, else use constZeta

constZeta :Constant value for Zeta if readZeta is .FALSE.

readSalt:. .TRUE/.FALSE. If .TRUE. read in salinity(salt) from NetCDF file, else use constSalt

constSalt: Constant value for Salt if readSalt is .FALSE.

readTemp : .TRUE/.FALSE. If .TRUE. read in temperature (temp) from NetCDF file, else use constTemp

constTemp: Constant value for Temp if readTemp is .FALSE.

readU :TRUE/.FALSE. If .TRUE. read in u-momentum component (U ) from NetCDF file, else use constU

constU: Constant value for U if readU is .FALSE.

readV:TRUE/.FALSE. ! If .TRUE. read in v-momentum component (V) from NetCDF file, else use constV

constV: Constant value for V if readV is .FALSE.

readW:TRUE/.FALSE.! If .TRUE. read in w-momentum component(W)from NetCDF file, else use constW

constW: Constant value for W if readW is .FALSE.

readAks :TRUE/.FALSE. If .TRUE. read in salinity vertical diffusion coefficient (Aks ) from NetCDF file, else use constAks

constAks: Constant value for Aks if readAks is .FALSE.

readDens :TRUE/.FALSE

constDens: Constant value for density if readDens is .FALSE. Generally unnecessary.

stokesprefix: prefix of the file for stokes drift input. Only if stokes drift is activated.

turbstd\_v\_a\_prefix: NOT USED CIURRENTLY

wavestd\_prefix: NOT USED CURRENTLY

Process\_VA: NOT USED CURRENTLY

POROCESS\_WA: NOT USED CURRENTLY

**TURBULENCE MODULE PARAMETERS:**

VTurbOn: Vertical Turbulence on (.TRUE.) or off (.FALSE.)

serr: Cubic spline error Cutoff

smth: Cubic spline smoothing parameter

sub: Resolution multiplier for Aks cubic spline smoothing

deltat: vertical turbulence parameter time step in seconds generally needs to be much less than dt. (1s)

AKSback: Background diffusivity (1.0D-8

HTurbOn :Horizontal Turbulence on (.TRUE.) or off (.FALSE.)

ConstantHTurb: Horizontal turbulence coefficient if HTurbOn is .TRUE (m^2/s).

**Advection MODULE PARAMETERS:**

Scheme: 1 - 4th order RK. no other advection presently

nsb: 0=Neutral,1- Surface trapped, 2 - Bottom trapped !

vertdist: (m) Used for nsb-2 or 3. Particles held at vertdist from surface or bottom.

**BEHAVIOR MODULE PARAMETERS:**

Behavior: Behavior type (specify a number) The behavior types numbers are 0 Passive, 1 swim up/down

OpenOceanBoundary: set to .TRUE. particles that interact with open boundaries stop.

pediage: NOT CURRENTLY USED

swimstart: NOT CURRENTLY USED

swimslow: NOT CURRENTLY USED

swimfast: Swim speed in m/s if Behavior is set to 1. Up is positive, down is negative.

Sgradient: NOT CURRENTLY USED

sink: NOT CURRENTLY USED

Hswimspeed: NOT CURRENTLY USED

Swimdepth: NOT CURRENTLY USED

**Fuchsparam parameters**: NOT CURRENTLY USED.

**Growth MODULE PARAMETERS:**

Growth:Growth type (specify a number) Note: The growth types numbers are 0 none, 1 Use deadage, 2 Use Growth equation,

mortality:! TRUE if particles can die; else FALSE

deadage: Age at which a particle stops moving (i.e., dies) in seconds Note: deadage stops particle motion for all behavior types (0-6)

*The rest of this is for a growth equation.*

initsize =250.0 ! Initial size of Larva(Egg size?)

maxsize=1000.0 ! Maximum size of larva. (Stop moving after this)

tempcut=2.0 ! Temperature cutoff for growth

a0=-29.8 ! Growth Coefficient 0

a1=3.86 ! Growth Coefficient 1

a2=0.0 ! Growth Coefficient 2

a3=0.0 ! Growth Coefficient 3

a4=-0.070 ! Growth Coefficient 4

a5=0.0 ! Growth Coefficient 5

a6=0.0 ! Growth Coefficient 6

a7=0.0 ! Growth Coefficient 7

a8=0.0 ! Growth Coefficient 8

**DVM PARAMTERS ARE NOT USED**

**SETTLEMENT MODULE PARAMETERS ARE NOT USED**

**GRID PARAMTERS**

Ngrid: number of nested grids. Set to one for no nesting. ROMSPath assumes grid order is from smalled to largest in size. Note there are several parameters that need to be Ngrid in length.: ConstantHTurb, stokesprefix, prefix

refine: the refinement bewteen successive grids. Should be Ngrid-1 long.

**ROMS FILE PARAMETERS**

prefix: Prefix of the ROMS history file. E.g. '/projects/f\_hfuchs\_1/data/ROMS/snaildel\_nestV04a00/snaildel\_his\_'

time\_vname: time variable name (usually ocean\_time)

time\_dname: time dimension name (usually ocean\_time)

filenum: Number (index) of the first netcdf file.

numdigits: number of digits in the file index.

multifile: .TRUE. means multiple files are used with indexing. .False. means only a single file/url

**Particle Initialization file**

parfile: name (with path) of the particle initialization file. File is in row,column format with no header.

Longitude, Latitude, depth, time in seconds after model initialization.

**Habitat Polygon Location Parameters are not currently used.**

**Output Related Variables**

Outpath: Path to output files.

NCOutFile: Output file name.

outpathGiven: If TRUE files are written to the path given in outpath. This is leftover from LTRANS.

NCtime: Time interval between creation of new NetCDF output files (seconds), setting this to 0 will result in just one large output file. I’m not actually sure this will work.

**NetCDF Model Metadata. Edit as you like, or not:**

RunName = 'ROMSPath v.4.2 test case'

ExeDir = '.'

OutDir = './output'

RunBy = 'ELI HUNTER'

Institution = 'RUTGERS'

StartedOn = 'A time in 2019'

**OTHER PARAMETERS**

seed: Seed for the Mesenne twister random number generator. If you set it to 0 a seed is chosen pseudo randomly.

Errorflag: This does not work anymore.

SaltTempOn: .TRUE./.FALSE. Calculate salinity and temperature at particle

SaltTempMean: .TRUE./.FALSE. Salinity and temperature are averaged over the last dt.

WriteBottom: .TRUE./.FALSE. Write Bottom stress.

WriteWaterDepth: .TRUE./.FALSE. Write Local water depth.

TempOffset: NOT CURRENTLY USED

TrackCollisions : NOT CURRENTLY USED

WriteHeaders : NOT CURRENTLY USED

WriteModelTiming : NOT CURRENTLY USED

Ijbuff: NOT CURRENTLY USED

Freeslip: NOT CURRENTLY USED