# Wave Breaking Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| alpha\* | Wave dissipation coefficient in Roelvink formulation | 1.0 | 0.5 - 2.0 | - |  |
| break | Type of breaker formulation | roelvink2 | roelvink1, baldock, roelvink2, roelvink\_daly, janssen |  |  |
| breakerdelay\* | Switch to enable breaker delay model | 1 | 0 - 1 | - |  |
| delta\* | Fraction of wave height to add to water depth | 0.0 | 0.0 - 1.0 | - |  |
| facrun\* | Calibration coefficient for short wave runup | 1.0 | 0.0 - 2.0 | - |  |
| facsd\* | Fraction of the local wave length to use for shoaling delay depth | 1.0 | 0.0 - 2.0 | - |  |
| fw\* | Bed friction factor | 0.0 | 0.0 - 1.0 | - |  |
| fwcutoff | Depth greater than which the bed friction factor is not applied | 1000.0 | 0.0 - 1000.0 | - |  |
| gamma | Breaker parameter in Baldock or Roelvink formulation | 0.55 | 0.4 - 0.9 | - |  |
| gamma2 | End of breaking parameter in Roelvink Daly formulation | 0.3 | 0.0 - 0.5 | - |  |
| gammax\* | Maximum ratio wave height to water depth | 2.0 | 0.4 - 5.0 | - |  |
| n\* | Power in Roelvink dissipation model | 10.0 | 5.0 - 20.0 | - |  |
| shoaldelay\* | Switch to enable shoaling delay | 0 | 0 - 1 | - |  |

# Morphology Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| dryslp | Critical avalanching slope above water (dz/dx and dz/dy) | 1.0 | 0.1 - 2.0 | - |  |
| dzmax\* | Maximum bed level change due to avalanching | 0.05 | 0.0 - 1.0 | m/s/m |  |
| hswitch\* | Water depth at which is switched from wetslp to dryslp | 0.1 | 0.01 - 1.0 | m |  |
| morfac | Morphological acceleration factor | 1.0 | 0.0 - 1000.0 | - |  |
| morfacopt\* | Switch to adjusting output times for morfac | 1 | 0 - 1 | - |  |
| morstart | Start time morphology, in morphological time | 120.0 | 0.0 - 10000000.0 | s |  |
| morstop | Stop time morphology, in morphological time | 2000.0 | 0.0 - 10000000.0 | s |  |
| ne\_layer | Name of file containing depth of hard structure |  |  | <file> |  |
| struct | Switch for enabling hard structures | 0 | 0 - 1 | - |  |
| wetslp | Critical avalanching slope under water (dz/dx and dz/dy) | 0.3 | 0.1 - 1.0 | - |  |

# Flow Boundary Condition Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| ARC\* | Switch for active reflection compensation at seaward boundary | 1 | 0 - 1 | - |  |
| back | Switch for boundary at bay side | abs\_2d | wall, abs\_1d, abs\_2d, wlevel |  |  |
| epsi\* | Ratio of mean current to time varying current through offshore boundary | -1.0 | -1.0 - 0.2 | - |  |
| freewave\* | Switch for free wave propagation 0 = use cg (default); 1 = use sqrt(gh) in instat = ts\_2 | 0 | 0 - 1 | - |  |
| front | Switch for seaward flow boundary | abs\_2d | abs\_1d, abs\_2d, wall, wlevel, nonh\_1d, waveflume |  |  |
| left | Switch for lateral boundary at ny+1 | neumann | neumann, wall, no\_advec, neumann\_v |  |  |
| nc\* | Smoothing distance for estimating umean (defined as nr of cells) | par%ny+1 | 1 - par%ny+1 | - |  |
| order\* | Switch for order of wave steering, 1 = first order wave steering (short wave energy only), 2 = second oder wave steering (bound long wave corresponding to short wave forcing is added) | 2.0 | 1.0 - 2.0 | - |  |
| right | Switch for lateral boundary at 0 | neumann | neumann, wall, no\_advec, neumann\_v |  |  |
| tidetype\* | Switch for offfshore boundary, velocity boundary or instant water level boundary | velocity | instant, velocity |  |  |

# Physical Processes

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| avalanching | Turn on avalanching | 1 | 0 - 1 | - |  |
| bchwiz | Turn on beachwizard | 0 | 0 - 1 | - |  |
| flow | Turn on flow calculation | 1 | 0 - 1 | - |  |
| gwflow\* | Turn on groundwater flow | 0 | 0 - 1 | - |  |
| lwave | Turn on short wave forcing on NLSW equations and boundary conditions | 1 | 0 - 1 | - |  |
| morphology | Turn on morphology | 1 | 0 - 1 | - |  |
| nonh\* | Turn on non-hydrostatic pressure: 0 = NSWE, 1 = NSW + non-hydrostatic pressure compensation Stelling & Zijlema, 2003 | 0 | 0 - 1 | - |  |
| q3d\* | Turn on quasi-3D sediment transport | 0 | 0 - 1 | - |  |
| sedtrans | Turn on sediment transport | 1 | 0 - 1 | - |  |
| setbathy | Turn on timeseries of prescribed bathy input | 0 | 0 - 1 | - |  |
| ships\* | Turn on ship waves | 0 | 0 - 1 | - |  |
| single\_dir\* | Turn on stationary model for refraction, surfbeat based on mean direction | 0 | 0 - 1 | - |  |
| snells\* | Turn on Snell's law for wave refraction | 0 | 0 - 1 | - |  |
| swave | Turn on short waves | 1 | 0 - 1 | - |  |
| swrunup\* | Turn on short wave runup | 0 | 0 - 1 | - |  |
| vegetation\* | Turn on interaction of waves and flow with vegetation | 0 | 0 - 1 | - |  |

# Wave-current Interaction Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| cats\* | Current averaging time scale for wci, in terms of mean wave periods | 4.0 | 1.0 - 50.0 | Trep |  |
| hwci\* | Minimum depth until which wave-current interaction is used | 0.1 | 0.001 - 1.0 | m |  |
| wci | Turns on wave-current interaction | 0 | 0 - 1 | - |  |

# Sediment Transport Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| BRfac\* | Calibration factor surface slope | 1.0 | 0.0 - 1.0 | - |  |
| Tbfac\* | Calibration factor for bore interval Tbore: Tbore = Tbfac\*Tbore | 1.0 | 0.0 - 1.0 | - |  |
| Tsmin\* | Minimum adaptation time scale in advection diffusion equation sediment | 0.5 | 0.01 - 10.0 | s |  |
| bdslpeffdir | Modify the direction of the sediment transport based on the bed slope | none | none, talmon |  |  |
| bdslpeffdirfac | Calibration factor in the modification of the direction | 1.0 | 0.0 - 2.0 | - |  |
| bdslpeffini | Modify the critical shields parameter based on the bed slope | none | none, total, bed |  |  |
| bdslpeffmag | Modify the magnitude of the sediment transport based on the bed slope, uses facsl | roelvink\_total | none, roelvink\_total, roelvink\_bed, soulsby\_total, soulsby\_bed |  |  |
| bed\* | Calibration factor for bed transports | 1 | 0 - 1 | - |  |
| betad\* | Dissipation parameter long wave breaking turbulence | 1.0 | 0.0 - 10.0 | - |  |
| bulk\* | Switch to compute bulk transport rather than bed and suspended load separately | 0 | 0 - 1 | - |  |
| dilatancy | Switch to reduce critical shields number due dilatancy | 0 | 0 - 1 | - |  |
| facAs\* | Calibration factor time averaged flows due to wave asymmetry | 0.1 | 0.0 - 1.0 | - |  |
| facDc\* | Option to control sediment diffusion coefficient | 1.0 | 0.0 - 1.0 | - |  |
| facSk\* | Calibration factor time averaged flows due to wave skewness | 0.1 | 0.0 - 1.0 | - |  |
| facsl\* | Factor bedslope effect | 1.6 | 0.0 - 1.6 | - |  |
| facua\* | Calibration factor time averaged flows due to wave skewness and asymmetry | 0.1 | 0.0 - 1.0 | - |  |
| fallvelred | Switch to reduce fall velocity for high concentrations | 0 | 0 - 1 | - |  |
| form | Equilibrium sediment concentration formulation | vanthiel\_vanrijn | soulsby\_vanrijn, vanthiel\_vanrijn |  |  |
| jetfac\* | Option to mimic turbulence production near revetments | 0.0 | 0.0 - 1.0 | - |  |
| lws\* | Switch to enable long wave stirring | 1 | 0 - 1 | - |  |
| lwt\* | Switch to enable long wave turbulence | 0 | 0 - 1 | - |  |
| pormax | Max porosity used in the experession of Van Rhee | 0.5 | 0.3 - 0.6 | - |  |
| reposeangle | Angle of internal friction | 30.0 | 0.0 - 45.0 | deg |  |
| rheeA | A parameter in the Van Rhee expression | 0.75 | 0.75 - 2.0 | - |  |
| smax\* | Maximum Shields parameter for equillibrium sediment concentration acc. Diane Foster | -1.0 | -1.0 - 3.0 | - |  |
| sus\* | Calibration factor for suspensions transports | 1 | 0 - 1 | - |  |
| sws\* | Switch to enable short wave and roller stirring and undertow | 1 | 0 - 1 | - |  |
| tsfac\* | Coefficient determining Ts = tsfac \* h/ws in sediment source term | 0.1 | 0.01 - 1.0 | - |  |
| turb\* | Switch to include short wave turbulence | bore\_averaged | none, wave\_averaged, bore\_averaged |  |  |
| turbadv\* | Switch to activate turbulence advection model for short and or long wave turbulence | none | none, lagrangian, eulerian |  |  |
| waveform | Wave shape model | vanthiel | ruessink\_vanrijn, vanthiel |  |  |
| z0\* | Zero flow velocity level in Soulsby and van Rijn (1997) sediment concentration | 0.006 | 0.0001 - 0.05 | m |  |

# Groundwater Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| aquiferbot\* | Level of uniform aquifer bottom | -10.0 | -100.0 - 100.0 | m |  |
| aquiferbotfile\* | Name of the aquifer bottom file |  |  | <file> |  |
| dwetlayer\* | Thickness of the top soil layer interacting more freely with the surface water | 0.1 | 0.01 - 1.0 | m |  |
| gw0\* | Level initial groundwater level | 0.0 | -5.0 - 5.0 | m |  |
| gw0file\* | Name of initial groundwater level file |  |  | <file> |  |
| gwReturb\* | Reynolds number for start of turbulent flow in case of gwscheme = turbulent | 100.0 | 1.0 - 600.0 | - |  |
| gwfastsolve\* | Reduce full 2D non-hydrostatic solution to quasi-explicit in longshore direction | 0 | 0 - 1 | - |  |
| gwheadmodel\* | Model to use for vertical groundwater head | parabolic | parabolic, exponential |  |  |
| gwhorinfil\* | Switch to include horizontal infiltration from surface water to groundwater | 0 | 0 - 1 | - |  |
| gwnonh\* | Switch to turn on or off non-hydrostatic pressure for groundwater | 0 | 0 - 1 | - |  |
| gwscheme\* | Scheme for momentum equation | laminar | laminar, turbulent |  |  |
| kx\* | Darcy-flow permeability coefficient in x-direction | 0.0001 | 1e-05 - 0.1 | ms^-1 |  |
| ky\* | Darcy-flow permeability coefficient in y-direction | 0.0001 | 1e-05 - 0.1 | ms^-1 |  |
| kz\* | Darcy-flow permeability coefficient in z-direction | 0.0001 | 1e-05 - 0.1 | ms^-1 |  |

# Mpi Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| mmpi\* | Number of domains in cross-shore direction when manually specifying mpi domains | 2 | 1 - 100 | - |  |
| mpiboundary\* | Fix mpi boundaries along y-lines, x-lines, use manual defined domains or find shortest boundary automatically | auto | auto, x, y, man |  |  |
| nmpi\* | Number of domains in alongshore direction when manually specifying mpi domains | 4 | 1 - 100 | - |  |

# Sediment Transport Numerics Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| cmax\* | Maximum allowed sediment concentration | 0.1 | 0.0 - 1.0 | - |  |
| sourcesink\* | Switch to enable source-sink terms to calculate bed level change rather than suspended transport gradients | 0 | 0 - 1 | - |  |
| thetanum\* | Coefficient determining whether upwind (1) or central scheme (0.5) is used. | 1.0 | 0.5 - 1.0 | - |  |

# Ship Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| nship\* | Number of ships | -123 |  | - |  |
| shipfile | Name of ship data file |  |  | <file> |  |

# Physical Constants

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| depthscale\* | Depthscale of (lab)test simulated, affects eps, hmin, hswitch and dzmax | 1.0 | 1.0 - 200.0 | - |  |
| g | Gravitational acceleration | 9.81 | 9.7 - 9.9 | ms^-2 |  |
| rho | Density of water | 1025.0 | 1000.0 - 1040.0 | kgm^-3 |  |

# Wind Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| Cd\* | Wind drag coefficient | 0.002 | 0.0001 - 0.01 | - |  |
| rhoa\* | Air density | 1.25 | 1.0 - 2.0 | kgm^-3 |  |
| windfile | Name of file with non-stationary wind data |  |  | <file> |  |
| windth | Nautical wind direction, in case of stationary wind | 270.0 | -360.0 - 360.0 | deg |  |
| windv | Wind velocity, in case of stationary wind | 0.0 | 0.0 - 200.0 | ms^-1 |  |

# Grid Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| alfa | Angle of x-axis from East | 0.0 | 0.0 - 360.0 | deg |  |
| depfile | Name of the input bathymetry file |  |  | <file> |  |
| dtheta | Directional resolution | 10.0 | 0.1 - 20.0 | deg |  |
| dtheta\_s | Directional resolution in case of stationary refraction | 10.0 | 0.1 - 20.0 | deg |  |
| dx | Regular grid spacing in x-direction | -1.0 | 0.0 - 1000000000.0 | m |  |
| dy | Regular grid spacing in y-direction | -1.0 | 0.0 - 1000000000.0 | m |  |
| gridform | Grid definition format | xbeach | xbeach, delft3d |  |  |
| nx | Number of computiation cell corners in x-direction | 50 | 2 - 10000 | - |  |
| ny | Number of computiation cell corners in y-direction | 2 | 0 - 10000 | - |  |
| posdwn | Bathymetry is specified positive down (1) or positive up (-1) | 1.0 | -1.0 - 1.0 | - |  |
| thetamax | Higher directional limit (angle w.r.t computational x-axis) | 90.0 | -180.0 - 180.0 | deg |  |
| thetamin | Lower directional limit (angle w.r.t computational x-axis) | -90.0 | -180.0 - 180.0 | deg |  |
| thetanaut | Switch to specify thetamin and thetamax in nautical convention rather than cartesian | 0 | 0 - 1 | - |  |
| vardx | Switch for variable grid spacing | 0 | 0 - 1 | - |  |
| xfile | Name of the file containing x-coordinates of the calculation grid |  |  | <file> |  |
| xori | X-coordinate of origin of axis | 0.0 | -1000000000.0 - 1000000000.0 | m |  |
| xyfile | Name of the file containing Delft3D xy-coordinates of the calculation grid |  |  | <file> |  |
| yfile | Name of the file containing y-coordinates of the calculation grid |  |  | <file> |  |
| yori | Y-coordinate of origin of axis | 0.0 | -1000000000.0 - 1000000000.0 | m |  |

# Bed Update Numerics Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| frac\_dz\* | Relative thickness to split time step for bed updating | 0.7 | 0.5 - 0.98 | - |  |
| merge\* | Merge threshold for variable sediment layer (ratio to nominal thickness) | 0.01 | 0.005 - 0.1 | - |  |
| nd\_var\* | Index of layer with variable thickness | 2 | 2 - par%nd | - |  |
| nsetbathy\* | Number of prescribed bed updates | 1 | 1 - 1000 | - |  |
| setbathyfile\* | Name of prescribed bed update file |  |  | <file> |  |
| split\* | Split threshold for variable sediment layer (ratio to nominal thickness) | 1.01 | 1.005 - 1.1 | - |  |

# Wave Boundary Condition Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| Hrms | Hrms wave height for instat = stat, bichrom, ts\_1 or ts\_2 | 1.0 | 0.0 - 10.0 | m |  |
| Tlong | Wave group period for case instat = bichrom | 80.0 | 20.0 - 300.0 | s |  |
| Trep | Representative wave period for instat = stat, bichrom, ts\_1 or ts\_2 | 10.0 | 1.0 - 20.0 | s |  |
| dir0 | Mean wave direction for instat = stat, bichrom, ts\_1 or ts\_2 (nautical convention) | 270.0 | 180.0 - 360.0 | deg |  |
| instat | Wave boundary condition type | bichrom | stat, bichrom, ts\_1, ts\_2, jons, swan, vardens, reuse, ts\_nonh, off, stat\_table, jons\_table |  |  |
| lateralwave | Switch for lateral boundary at left | neumann | neumann, wavecrest, cyclic |  |  |
| m | Power in cos^m directional distribution for instat = stat, bichrom, ts\_1 or ts\_2 | 10 | 2 - 128 | - |  |
| nmax\* | Maximum ratio of cg/c for computing long wave boundary conditions | 0.8 | 0.5 - 1.0 | - |  |
| taper | Spin-up time of wave boundary conditions, in morphological time | 100.0 | 0.0 - 1000.0 | s |  |

# Non-hydrostatic Correction Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| Topt\* | Absolute period to optimize coefficient | 10.0 | 1.0 - 20.0 | s |  |
| breakviscfac\* | Factor to increase viscosity during breaking | 1.5 | 1.0 - 3.0 | - |  |
| breakvisclen\* | Ratio between local depth and length scale in extra breaking viscosity | 1.0 | 0.75 - 3.0 | - |  |
| dispc\* | Coefficient in front of the vertical pressure gradient | 1.0 | 0.1 - 2.0 | ? |  |
| kdmin\* | Minimum value of kd (pi/dx > min(kd)) | 0.0 | 0.0 - 0.05 | - |  |
| maxbrsteep\* | Maximum wave steepness criterium | 0.6 | 0.3 - 0.8 | - |  |
| nhbreaker\* | Non-hydrostatic breaker model | 2 | 0 - 3 | - |  |
| reformsteep\* | Wave steepness criterium to reform after breaking | 0.25d0\*par%maxbrsteep | 0.0 - 0.95d0\*par%maxbrsteep | - |  |
| secbrsteep\* | Secondary maximum wave steepness criterium | 0.5d0\*par%maxbrsteep | 0.0 - 0.95d0\*par%maxbrsteep | - |  |
| solver\* | Solver used to solve the linear system | tridiag | sip, tridiag |  |  |
| solver\_acc\* | Accuracy with respect to the right-hand side usedin the following termination criterion: ||b-Ax || < acc\*||b|| | 0.005 | 1e-05 - 0.1 | - |  |
| solver\_maxit\* | Maximum number of iterations in the linear sip solver | 30 | 1 - 1000 | - |  |
| solver\_urelax\* | Underrelaxation parameter | 0.92 | 0.5 - 0.99 | - |  |

# Variables, Not Read In Params.txt

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| dt | Computational time step, in hydrodynamic time | -123 |  | s |  |
| t | Computational time, in hydrodynamic time | -123 |  | s |  |
| tnext | Next time point for output or wave stationary calculation, in hydrodynamic time | -123 |  | s |  |

# Wave-spectrum Boundary Condition Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| Tm01switch\* | Switch to enable Tm01 rather than Tm-10 | 0 | 0 - 1 | - |  |
| bcfile | Name of spectrum file |  |  | <file> |  |
| correctHm0\* | Switch to enable Hm0 correction | 1 | 0 - 1 | - |  |
| dtbc\* | Timestep used to describe time series of wave energy and long wave flux at offshore boundary (not affected by morfac) | 1.0 | 0.1 - 2.0 | s |  |
| dthetaS\_XB\* | The (counter-clockwise) angle in the degrees needed to rotate from the x-axis in SWAN to the x-axis pointing East | 0.0 | -360.0 - 360.0 | deg |  |
| fcutoff\* | Low-freq cutoff frequency for instat = jons, swan or vardens boundary conditions | 0.0 | 0.0 - 40.0 | Hz |  |
| nonhspectrum\* | Spectrum format for wave action balance of nonhydrostatic waves | 0 | 0 - 1 | - |  |
| nspectrumloc\* | Number of input spectrum locations | 1 | 1 - par%ny+1 | - |  |
| nspr\* | Switch to enable long wave direction forced into centres of short wave bins | 0 | 0 - 1 | - |  |
| oldnyq\* | Switch to enable old nyquist switch | 0 | 0 - 1 | - |  |
| random\* | Switch to enable random seed for instat = jons, swan or vardens boundary conditions | 1 | 0 - 1 | - |  |
| rt | Duration of wave spectrum at offshore boundary, in morphological time | min(3600.d0 | par%tstop - None | s |  |
| sprdthr\* | Threshold ratio to maximum value of S above which spectrum densities are read in | 0.08 | 0.0 - 1.0 | - |  |
| trepfac\* | Compute mean wave period over energy band: par%trepfac\*maxval(Sf) for instat jons, swan or vardens; converges to Tm01 for trepfac = 0.0 and | 0.01 | 0.0 - 1.0 | - |  |
| wbcversion\* | Version of wave boundary conditions | 3 | 1 - 3 | - |  |

# Flow Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| C | Chezy coefficient | 55.0 | 20.0 - 100.0 | m^0.5s^-1 |  |
| bedfriccoef | Bed friction coefficient | 0.01 | 3.5e-05 - 0.9 | - |  |
| bedfricfile | Bed friction file (only valid with values of C) |  |  | <file> |  |
| bedfriction | Bed friction formulation | chezy | chezy, cf, white-colebrook, manning, white-colebrook-grainsize |  |  |
| cf\* | Friction coefficient flow | 0.003 | 0.001 - 0.1 | - |  |
| nuh | Horizontal background viscosity | 0.1 | 0.0 - 1.0 | m^2s^-1 |  |
| nuhfac\* | Viscosity switch for roller induced turbulent horizontal viscosity | 1.0 | 0.0 - 1.0 | - |  |
| nuhv\* | Longshore viscosity enhancement factor, following Svendsen (?) | 1.0 | 1.0 - 20.0 | - |  |
| smag\* | Switch for smagorinsky subgrid model for viscocity | 1 | 0 - 1 | - |  |

# Coriolis Force Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| lat\* | Latitude at model location for computing Coriolis | 0.0 | -90.0 - 90.0 | deg |  |
| wearth\* | Angular velocity of earth calculated as: 1/rotation\_time (in hours) | 1.d0/24.d0 | 0.0 - 1.0 | hour^-1 |  |

# Wave Numerics Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| maxerror\* | Maximum wave height error in wave stationary iteration | 5e-05 | 1e-05 - 0.001 | m |  |
| maxiter\* | Maximum number of iterations in wave stationary | 500 | 2 - 1000 | - |  |
| scheme\* | Numerical scheme for wave propagation | upwind\_2 | upwind\_1, lax\_wendroff, upwind\_2 |  |  |
| wavint | Interval between wave module calls (only in stationary wave mode) | 60.0 | 1.0 - 3600.0 | s |  |

# Initial Conditions

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| hotstartflow\* | Switch for hotstart flow conditions with pressure gradient balanced by wind and bed stress | 0 | 0 - 1 | - |  |
| zs0 | Inital water level | 0.0 | -5.0 - 5.0 | m |  |
| zsinitfile | Name of inital water level file |  |  | <file> |  |

# Model Time

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| CFL | Maximum Courant-Friedrichs-Lewy number | 0.7 | 0.1 - 0.9 | - |  |
| tstop | Stop time of simulation, in morphological time | 2000.0 | 1.0 - 1000000.0 | s |  |
| tunits\* | Time units in udunits format (seconds since 1970-01-01 00:00:00.00 +1:00) | 's' |  | - |  |

# Drifters Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| drifterfile | Name of drifter data file |  |  | <file> |  |
| ndrifter | Number of drifers | par%ndrifter | 0 - 50 | - |  |

# Bed Composition Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| D15 | D15 grain size per grain type | 1 | size(par%D15 - None | m |  |
| D50 | D50 grain size per grain type | 1 | size(par%D50 - None | m |  |
| D90 | D90 grain size per grain type | 1 | size(par%D90 - None | m |  |
| dzg1\* | Thickness of top sediment class layers | par%dzg1 | 0.01 - 1.0 | m |  |
| dzg2\* | Nominal thickness of variable sediment class layer | par%dzg1 | 0.01 - 1.0 | m |  |
| dzg3\* | Thickness of bottom sediment class layers | par%dzg1 | 0.01 - 1.0 | m |  |
| nd\* | Number of computational layers in the bed | 3 | 3 - 1000 | - |  |
| ngd | Number of sediment classes | 1 | 1 - 20 | - |  |
| por | Porosity | 0.4 | 0.3 - 0.5 | - |  |
| rhos | Solid sediment density (no pores) | 2650.0 | 2400.0 - 2800.0 | kgm^-3 |  |
| sedcal\* | Sediment transport calibration coefficient per grain type | 1 | size(par%sedcal - None | - |  |
| ucrcal\* | Critical velocity calibration coefficient per grain type | 1 | size(par%ucrcal - None | - |  |

# Q3d Sediment Transport Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| kmax\* | Number of sigma layers in Quasi-3D model; kmax = 1 is without vertical structure of flow and suspensions | 1 | 1 - 1000 | - |  |
| sigfac\* | Dsig scales with log(sigfac) | 1.3 | 0.0 - 10.0 | - |  |
| vicmol\* | Molecular viscosity | 1e-06 | 0.0 - 0.001 | - |  |
| vonkar\* | Von Karman constant | 0.4 | 0.01 - 1.0 | - |  |

# Output Variables

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| globalvars\* | Mnems of global output variables, not per se the same size as nglobalvar (invalid variables, defaults) | 'abc' |  | - |  |
| meanvars\* | Mnems of mean output variables (by variables) | 'abc' |  | - |  |
| ncfilename\* | Xbeach netcdf output file name |  |  | <file> |  |
| ncross\* | Number of output cross sections | 0 | 0 - 50 | - |  |
| nglobalvar | Number of global output variables (as specified by user) | -1 | -1 - 20 | - |  |
| nmeanvar | Number of mean, min, max, var output variables | 0 | 0 - 15 | - |  |
| npoints | Number of output point locations | 0 | 0 - 50 | - |  |
| npointvar | Number of point output variables | 0 | 0 - 50 | - |  |
| nrugauge | Number of output runup gauge locations | 0 | 0 - 50 | - |  |
| nrugdepth\* | Number of depths to compute runup in runup gauge | 1 | 1 - 10 | - |  |
| outputformat\* | Output file format | fortran | fortran, netcdf, debug |  |  |
| pointtypes\* | Point types (0 = point, 1 = rugauge) | > NULL() |  | - |  |
| pointvars\* | Mnems of point output variables (by variables) | 'abc' |  | - |  |
| rugdepth\* | Minimum depth for determination of last wet point in runup gauge | 1 | size(par%rugdepth - None | m |  |
| timings\* | Switch enable progress output to screen | 1 | 0 - 1 | - |  |
| tintc\* | Interval time of cross section output | 1.0 | 0.01 - 100000.0 | s |  |
| tintg | Interval time of global output | 1.0 | 0.01 - 100000.0 | s |  |
| tintm | Interval time of mean, var, max, min output | par%tstop-par%tstart | 1.0 - par%tstop-par%tstart | s |  |
| tintp | Interval time of point and runup gauge output | 1.0 | 0.01 - 100000.0 | s |  |
| tscross\* | Name of file containing timings of cross section output | None | None - None | - |  |
| tsglobal\* | Name of file containing timings of global output | None | None - None | - |  |
| tsmean\* | Name of file containing timings of mean, max, min and var output | None | None - None | - |  |
| tspoints\* | Name of file containing timings of point output | None | None - None | - |  |
| tstart | Start time of output, in morphological time | 1.0 | 0.0 - 1000000.0 | s |  |

# Flow Numerics Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| eps | Threshold water depth above which cells are considered wet | 0.005 | 0.001 - 0.1 | m |  |
| eps\_sd | Threshold velocity difference to determine conservation of energy head versus momentum | 0.5 | 0.0 - 1.0 | m/s |  |
| hmin | Threshold water depth above which Stokes drift is included | 0.2 | 0.001 - 1.0 | m |  |
| oldhu\* | Switch to enable old hu calculation | 0 | 0 - 1 | - |  |
| secorder\* | Use second order corrections to advection/non-linear terms based on MacCormack scheme | 0 | 0 - 1 | - |  |
| umin | Threshold velocity for upwind velocity detection and for vmag2 in equilibrium sediment concentration | 0.0 | 0.0 - 0.2 | m/s |  |

# Vegetation Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| nveg | Number of vegetation species | -123 |  | - |  |
| veggiefile | Name of vegetation species list file |  |  | <file> |  |
| veggiemapfile | Name of vegetation species map file |  |  | <file> |  |

# Flow Discharge Boundary Conditions

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| disch\_loc\_file\* | Name of discharge locations file |  |  | <file> |  |
| disch\_timeseries\_file\* | Name of discharge timeseries file |  |  | <file> |  |
| ndischarge\* | Number of discharge locations | par%ndischarge | 0 - 100 | - |  |
| ntdischarge\* | Length of discharge time series | par%ntdischarge | 0 - 100 | - |  |

# Tide Boundary Conditions

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| paulrevere | Specifies tide on sea and land or two sea points if tideloc = 2 | land | land, sea |  |  |
| tideloc | Number of corner points on which a tide time series is specified | 0 | 0 - 4 | - |  |
| zs0file | Name of tide boundary condition series |  |  | <file> |  |

# Constants, Not Read In Params.txt

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| compi | Imaginary unit | -123 |  | - |  |
| px | Pi | -123 |  | - |  |
| rhog8 | 1/8\*rho\*g | -123 |  | Nm^-3 |  |

# Roller Parameters

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| beta\* | Breaker slope coefficient in roller model | 0.1 | 0.05 - 0.3 | - |  |
| rfb\* | Switch to feed back maximum wave surface slope in roller energy balance, otherwise rfb = par%Beta | 0 | 0 - 1 | - |  |
| roller\* | Switch to enable roller model | 1 | 0 - 1 | - |  |

# Output Projection

| keyword | description | default | range | units | remark |
| --- | --- | --- | --- | --- | --- |
| projection\* | Projection string | ' ' |  | - |  |
| rotate | Rotate output as postprocessing with given angle | 1 | 0 - 1 | - |  |
|  |  |  |  |  |  |