

XBeach, version 1.23.5527, codename 'XBeach X' final release
Release date: Friday, November 9th, 2018

These release notes specify the changes with respect to the previous XBeach release; the 1.23.5387, codename 'King's Day' (2015). XBeach X is named in honor of the 10th anniversary of the first presentation of the code at the 10th International Workshop on Wave Hindcasting and Forecasting and Coastal Hazard Symposium in Hawaii, on November 11, 2007. Thanks to all users for testing the beta version of XBeach X and giving us feedback!

The new release includes:

New physical formulations

- XBeach-G: gravel morphodynamics and groundwater (keyword useXBeachGSettings=1)
 - https://xbeach.readthedocs.io/en/latest/xbeach_manual.html#gravel-xbeach-g
- Bermslope effects (keyword: bermslope = desired slope)
 - http://xbeach.readthedocs.io/en/latest/xbeach_manual.html#bed-slope-effect
- Sediment transport with Van Rijn (1993) (keyword: form = vanrijn1993).
 - Van Rijn (1993) is more sensitive for variations in grain size (D50).
 - https://xbeach.readthedocs.io/en/latest/xbeach_manual.html#van-rijn-1993

Modifications physical formulations

- Updated default settings. See the next page for the main differences in default settings.
- Spatially-varying bed friction input (keyword: bedfriction)
 - Consistent formulation of bed friction. Old options cf and Chezy are deleted. Always use keyword: bedfriction for the bed friction formulation (e.g. cf, Manning, Chezy) and use keyword: bedfriccoef for the coefficient (e.g. 55).
- Improved description of wave-current interaction (keyword: wci = 1).
- Added an in-canopy flow model for vegetation (keyword: porcanflow = 1).
- Added dynamic updating of roughness field based on erosion and sediment of vegetation layers (keyword: dynamrough).
- Added additional sensitivity to D50, similar to DUROS-TA (keyword: alfaD50).

Boundary conditions

- New "wbctype" boundary conditions and "wavemodel".
 - Use wavemodel to define if you are running the model in stationary, surfbeat or non-hydrostatic mode.
 - Use wbctype to define the wave boundary condition type you would like to use (e.g. swan or jons_table).
 - See on the next page a conversion table. The table is coloured coded with green supported functionality and red not-supported functionality. In each cell the old way of describing wave boundary conditions is added.
- Prescribed non-hydrostatic velocities in u and v direction .
- Prescribed second-layer non-hydrostatic velocities (keyword: nonhq3d=1).
 - The added value of a non-hydrostatic simulation with a second-layer is related to better dispersion properties.
- Improved second-order effect by using a new formulation for the interaction coefficient.
- Added multi-model spectra.
 - Add nmodal = 2 (or more) and specify the other parametric parameters.
- Added support for TMA spectra.
 - Add tma = 1 in your parametric wave boundary file.

Numerical modifications

- Implemented Warming and Beam (1979) numerical scheme.
 - Warming and Beam is superior compared to a second-order upwind scheme (scheme = upwind_2) and is therefore now used as a default option.

Skillbed

- Added laboratory cases with vegetation to test XBeach-VEG.
- Add gravel cases to test XBeach_G formulations.

Manual

- Updated, online version describing the new functionalities.
- Added links to BMI examples in XBeach docs.
- Updated tutorial.

Bug fixes

- Boundary condition "water levels" have been removed.
- Improved the parallelization (MPI) including issues regarding XBeach-VEG and MPI.
- Improved the stationary model for refraction and surfbeat based on mean direction (keyword: single_dir = 1).
- Numerous small bug fixes.

List of revised default values

- XBeach will not give warnings for large thetamin, thetamax or dtheta values
 - A range of -360 degrees and + 360 for thetamin/thetamax are now used.
 - dtheta can be up to 180 degrees (used for single_dir simulations)
- For wavebreaking, a gammax of 0.6 for stationary simulations and 2.0 for surfbeat simulations are now used by default. This was for both wavemodels gammax = 2.
- A maximum breakerdelay of 3.0 is now the advised maximum value.
- For wavemodel = nonh, XBeach automatically turns of the short wave action balance (swave =0), creates a non-hydrostatic spectrum (nonhspectrum = 1) and uses second-order effects (keyword: secorder)
- For nhbreaker = 1 and = 2, the maxbrsteep is decreased for 0.6 to 0.4. For nhbreaker =3, the maxbrsteep is still 0.6.
- Maximum output time steps is now related to the tstop and tstart.
- The default numerical scheme changed from upwind_2 to warmbeam.
- The default maximum error (keyword: maxerror) of the stationary wave solver varies now between 1) wavemodel = stationary and 2) wavemodel = surfbeat with single_dir. Respectively, the default maxerror is 0.005 and 0.0005 and scales with the deptscale.
- For gravel simulations (keyword: useXBeachGSettings) different default settings are used than for other simulations (e.g. different D50).

Spectral boundary conditions

For example: in previous versions of XBeach you could launch a surfbeat simulation forced with a SWAN *sp2-file via `instat = swan`. Since the XBeach X release you can do this via `wavemodel = surfbeat` and `wbctype = swan`.

wbctype =	parametric	swan	vardens	jonstable
wavemodel = stat	instat =stat nonh = 0	not possible	not possible	instat = stat_table nonh =0
wavemodel = surfbeat	instat =jons nonh = 0	instat = swan nonh = 0	instat = vardens nonh = 0	instat = jons_table nonh = 0
wavemodel = nonh	instat = jons nonh = 1	instat = swan nonh = 1	instat = vardens nonh = 1	instat = jons_table nonh = 1

Other type boundary conditions

For example: in previous versions of XBeach you could launch a nonh simulation with `ts_nonh` time series via `instat = ts_nonh`. Since the XBeach X release you can do this via `wavemodel = nonh` and `wbctype = ts_nonh`.

wbctype =	params (bichrom)	off	ts_1	ts_2	ts_nonh	reuse
wavemodel = stat	instat =stat nonh = 0	not possible	not possible	not possible	not possible	instat = reuse nonh = 0
wavemodel = surfbeat	instat =bichrom nonh = 0	instat = off nonh = 0	instat =ts_1 nonh = 0	instat =ts_2 nonh = 0	not possible	instat = reuse nonh = 0
wavemodel = nonh	not possible	instat = off nonh = 0	not possible	not possible	instat = ts_nonh nonh=1	instat = reuse nonh = 1