Rijkswaterstaat
Ministry of Infrastructure and Water Management

RELEASE NOTES

BASELINE 6.3.2

(March 2023)

Deltares voert het beheer en onderhoud aan de Baseline-software uit op basis van de Service Level Agreements (SLA) met het Ministerie van Infrastructuur en Waterstaat

Deltares
Enabling Delta Life

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1 Overview

Name	:	BASELINE
Version	:	6.3.2
Buildnumber	.	2739
Date	:	March 13 2023
Classification	:	release
Distribution	:	https://iplo.nl/thema/water/applicaties-modellen/watermanagementmodellen/baseline/ (see Downloads)

The following tools are part of the installation:

- Bas2FM 1.0.26
- Baseline6 Input Module (BIM6) 0.0.6
- Baseline6 Validation tools protocolcheck 32 / contentcheck 54
- Baseline6 Convertor 0.3.0
- Baseline6 Waterlevel tool 0.1.7
- Baseline6 Fetch tool 1.2
- Baseline6 Special Elevation Model tool 1.5.4
- Baswaq.exe (conversion to SWAN) 2.66

Baseline 6 is intended to generate input for the sixth-generation models of Rijkswaterstaat. The data model has been adjusted significantly and is not compatible with Baseline 5. The first release, Baseline 6.1.1 was not distributed, as the data model needed a further update. The data model is documented in Baseline 6 Data protocol [Documentation: 2].

The major change in Baseline 6.2 is the functionality to combine land- and seadata, defined in different coordinate systems. The datamodel is again extended.

The main improvements in Baseline 6.3.1 concern Bas2swan (conversion of sea-data) with an improved interpolation method for the (sea)bedlevels. Baseline 6.3.0 has not been released due to instabilities.
In the second half of 2022 a Proof of Concept was conducted in the use of Baseline 6.3.1 in the process of “Vergunningverlening” (dutch). The recommendations are implemented in Baseline 6.3.2.

Finally, Baseline 6.3.2 is compatible with D-HYDRO Suite 2023.01 (and higher).

Please, take good notice of the “*Known issues*”.

2 Documentation

1. Baseline6_Installation_Manual.pdf
2. Baseline6_Dataprotocol.pdf
3. Baseline6_Help.pdf

3 Functionality

3.1 New in BASELINE 6.3.2

No new functionalities, only improvements and / or fixes (see *Overview of improvements*).

3.2 New in BASELINE 6.3.1

Datamodel

1. No changes

Preparation tools

1. Tool 06a.renumber routes and events in *measures*.
2. Tool 1, 6 and 6a can be used on an entire database now to process multiple *Featureclasses*.

Assimilate measures and clip

1. Improvement of error handling when *measure_contour_polygons* is used in different Baseline functions. A generalization of *measure_contour_polygons* is applied when using a 1 meter tolerance.
2. Improved routine to append point information in feature dataset Elevation, in order to prevent errors when clipping, assimilating or merging extensive datasets.

Bas2FM

1. When a modelboundary is used in Bas2FM the elevation is updated in the NetCDF within this modelboundary and also extrapolated to 250 metres outside of the modelboundary..
2. Besides the traditional method to derive surface information from an elevation_model_terrain (linear interpolation) or elevation_raster (bilinear interpolation) Bas2FM now supports grid cell averaging within Thiessen polygons around fm nodes. For this function the Spatial Analist extension is required**.**

Bas2swan

1. Baswaq updated to use gridcell averaging (elevation interpolation) instead of “LINEAR” interpolation for land-databases and “BILINEAR” interpolation for sea-databases.

Content checker

1. Tolerance of elevation points on same location altered (5 centimeters).
2. Truncation of lines in logfile removed.
3. Some special items from converted Baseline 5 data are whitelisted.

Advanced tools

1. Create initial waterlevel is improved:
    a. Boundary summerbed is defined by the shoreline as defined by sections (section2/3) and not by roughness codes 102 and 103.
    b. Connected waterbodies are treated in accordance to the summerbed.
    c. Improved moving average algorithm to smooth the elevation of shorelines.
    d. Open water boundaries receive a more realistic elevation.

3.3 New in BASELINE 6.3.0

Datamodel

1. Sorting field in output_locations, structure_lines source_sink_points and cross_section_lines altered in Text because the required information did not fit into a Long Integer
2. New FDS elevation_mosaic and new raster elevation_raster_land added on behalf of higher resolution required in the land domain of sea models.

Preparation tools

1. Tool 08. Create Measure_contour_polygons now works with a user defined buffer distance.

Assimilate measures, clip and erase

1. Improvement of error handling when measure_contour_polygons is used in different Baseline functions.

Bas2FM

1. Converting the NetCDF and Netgeom to GIS featureclasses is now done in a separate function and has to be done only once for each pair of NetCDF/Netgeom. This reduces the subsequent conversion time in Bas2FM, especially when more variants are converted using the same NetCDF.
2. This function is added to the batch functionality.
3. The use of a modelboundary is added to Bas2FM in order to convert only a certain part of a Baseline database.
4. Besides the traditional method to derive surface information from an elevation_model_terrain (linear interpolation) or elevation_raster (bilinear interpolation) Bas2FM now supports grid cell averaging within the polygons of fm faces. For this function the Spatial Analist extension is required**. This function is only beta, there still is discussion about the representative polygon to use for averaging.**
5. Bed_characteristics_polygons is now added to the Bas2FM menu; in previous versions this Featureclass was taken into account without user interaction.

Bas2swan

1. “Add schematisation” updated in order to make an equivalent folder structure as used in D-Flow FM.
2. Baswaq updated to write output with similar names and extensions as used in D-Flow FM.
3. The use of a modelboundary is added to Bas2swan in order to convert only a certain part of a Baseline database.
4. Bas2SWAN updated to add terrain_jump_3d_lines, flow_blocking_lines and flow_blocking_polygons to fixed weirs. Flow_blocking_lines and flow_blocking_polygons are treated as high walls so no flow can pass these objects.
5. Bas2swan updated to deal with sea variants and merged sea variants.
6. Baswaq updated to work with data in spherical projection (eg. WGS1984).

Protocol checker

1. Tolerance of objects falling within measure_contour_polygons altered (5 meters).

Toolbar

1. Improved Z-tool (all vertices and Z-values are shown within a drawn box).

3.4 New in BASELINE 6.2.1

Baseline setups for ArcGis 10.6.1, 10.7.1 and 10.8.1

3.5 New in BASELINE 6.2.0

Datamodel

1. Datamodel extension with variant_sea and measure_sea (Baseline data in non-projected coordinate systems)
2. Datamodel adaptations:
    a. structures have a direction
    b. Sorting field added in structure_lines, source_sink_points and branch_1d_lines
    c. Field Fixed_weir_definition removed
    d. Elevated lines removed from elevation_model_terrain
    e. Field Roughnesscode in flowblocking_polygons removed
    f. Fields connected and groundlevel in land_use_polygons removed
    g. New FC bed_characteristics_input_polygons and bed_characteristics_polygons added on behalf of smooth roughness gradients

Bas2FM

1. Baseline 6 compatible with netgeom-file in D-HYDRO 2020-04 (CF-1.8 UGRID-1.0 Deltares-0.10)
2. Description added for installation of 3dparty software for Bas2FM
3. Shorter filenames exported by Bas2FM
4. Baseline export according to adapted folder stucture
5. Folder meta-info added to Repos-structure Bas2FM output
6. consequent filenames added FM input
7. Bas2FM adapted to generate partial conversions
8. All used Bas2FM input added to Bas2FM.log
9. Temporary files are cleared after conversion

Preparation tools

1. Preparation tool - added: “create landuse_polygons”
2. Improvement of tool 08: Create measure contour

Toolbar

1. Added functionality to add, create, edit and assimilate Sea_variants and measures
2. Added functionality to merge land- and sea-databases
3. Improvement of clip function

3.6 New in BASELINE 6.1.2

The following changes were implemented:

1. Default use of “Villemonte” option instead of “Tabellenboek” for weirs.
2. Initial waterlevel model can be added to a batch.

3. When the functions “Assimilate measures”, “Clip”, “Erase”, “Conversion to D-Flow FM” or “Conversion to SWAN” are opened a check is performed whether 3D-analyst is checked in. This is also done when these functions are used in batch-mode.
4. Smooth transitions for calibration purposes is added.
5. Non existing FeatureClasses are skipped in TOC when setting active variant. Therefore also _lijnen and _punten files are added to all templates.
6. A batch Clip function has become available within the existing clip-function.
7. The protcolcheck accepts measurenames with maximum 27 characters.
8. Some errors in the Contentcheck are fixed.
9. The term “WBI” has changed to “BOI”.
10. Output_locations and cross_section_lines have new “type” definitions.

3.7 New in BASELINE 6.1.1

The following changes were implemented:

1. Change in the data model: ‘bandijken’ are treated both as elevated_lines (using elevation_crest) and as terrain_edge_3d_lines (using elevation_toe) and as such included in the elevation model (Terrain).
2. Bridge pillars can be added, mixed and converted to an input-file for D-HYDRO Suite / D-Flow Flexible Mesh.
3. Polygons can be added, that will be used in the calibration process. These will not be part of the simulation model.

3.8 New in BASELINE 6.0.5

The following changes were implemented.

1. The mixer routine is adjusted to account for different values for TYPE in weirs and terrain jumps. Feature classes *weirs_routes, terrainjumps_3d_routes, erase_weirs* and *erase_terranjumps_3d* have to be split in different values for TYPE (2 possible values) before they can be treated by the Erase tool.
2. The names of several feature classes were adjusted (amongst others: weirs => *elevated_line*, breaklines => *terrain_edge*, roughness => *land_use*). Some feature classes were moved to the *models* feature dataset (flow_blocking_lines and flow_blocking_polygons). The name of the *terrain* dataset has also been adjusted. In addition, both *code* and *template FileGeoDataBases* and *layerfiles* were adjusted.
3. A number of (Python) toolboxes were added to the Baseline toolbar, amongst others: *Fetch tool*, *Create initial waterlevel*, *Create special elevation model*, *Baseline 5 to 6 converter* (>Tools >Advanced tools) and all tools belonging to the *Input Module toolset* (>Preparation).
4. Conversion to D-Flow FM (Bas2FM) is added to the Baseline Toolbar (>Models). Bas2FM is also added to the *Batch* functionality.
5. Conversion to SWAN is adjusted to the Baseline 6 data protocol.

3.9 New in BASELINE 6.0

The major changes are:

1. A major update of the data model: simplified (no duplications) and extended compared to Baseline 5. All feature classes that are part of the elevation model

are now part of the *Elevation* feature dataset and part of an existing *Terrain* dataset (in order to avoid duplication). Some feature classes were merged.

2. All feature classes, tables and feature datasets are now in English.
3. The mixer has been adjusted, so it can handle more than one *measure* in the *measurelist*. First, *measures* are mixed together. Then, they are mixed (as one) into the *variant*.
4. Some Baseline 5 functions are now obsolete. These were removed, e.g.: “aanmaken overlaten”, “aanmaken waterhoogtemodel”, “aanmaken hoogtemodel”, ‘conversie van hoogtelijnen”.
5. The “Conversie naar ruwheden” functionality has been removed as all roughnesses are in one feature class now.
6. The “Conversie naar Waqua” and “Conversie naar Delft3D” were removed, as Baseline 6 is intended for the sixth-generation models in D-HYDRO Suite.
7. The “Omzetten naar RGFgrid” functionality has been removed.
8. A new “BaseTool” is added to the toolbar to present coordinates of 3D lines (as labels).

4 Systemrequirements

Operating systeem	
Minimum	Microsoft Windows 10 (64-bit)
Recommended	Microsoft Windows 10 (64-bit)
Processor	
Minimum	Single Core 1.6 GHz
Recommended	Dual Core 1.6 GHz or higher
RAM	
Minimum	4 GB
Recommended	8 GB or higher
Required disk space	
	3.2 GB
Screen resolution	
Minimum	1024 x 768, 24 bit color depth
Recommended	1280 x 1024, 32 bit color depth
Software	
Minimum	ArcGIS 10.6.1
Supported on	10.5, 10.6.1. 10.7.1 and 10.8.1 (Advanced Licence with 3D Analyst and Spatial Analist)
Recommended	ArcGIS 10.6.1, with 3D Analyst and Spatial Analist

5 Known issues

1. Baseline 5 to 6 convertor
    - special attention should be given to measures which in Baseline 5 contain *erase_plassen* or *erase_hoogwatervrije_vlakken* in which the polygons intersect the main channel. In the resulting Baseline 6 measure the roughness code of the main channel part might be outdated.
2. Mixing a lot (>200) of measures or an extensive measure can take long (as a lot of memory has to be allocated). This can also lead to unexpected problems ("Attempting to divide by zero").
3. When a merged sea-variant is added as active variant both *elevation_raster* and *elevation_raster_land* are shown in the TOC using a mosaic dataset. However the default symbology is not copied form the *variant_sea.lyr*.
   Workaround is to copy
   `C:\Program Files (x86)\Deltares\Baseline6\Template\variant_sea\variant_sea.lyr`
   in the *sea_variant* in subfolder `data\layers` prior to setting the active variant.
4. The window to select a projection, does not load the current projection automatically. This is an artifact (defect) of ArcGIS.
5. Bas2FM:
    - Small differences occur in Bas2FM output in different ArcGIS versions; the order of *Fixed weirs* might be different between versions.
    - Bas2FM can take a long time when converting larger models; for example the complete conversion of the Rhine Meuse model including Volkerak Zoommeer might last 45 hours (without initial waterlevel model). This is mostly due to the translation of *land_use* to trachytopes. In future versions performance improvement is desired.
    - If an error occurs in Bas2FM and the conversion is done a second time, it is recommended to remove the previous made <model name>.gdb in (models\dflowfm\<model name>\geometry) and restart ArcGIS.
    - Bas2FM might crash when special characters (like ű in brűcke) are used in the NAME field of various location featureclasses (*structures, bridges, sources_sinks*). It is strongly advised to replace these characters by standard characters.
6. Conversion to SWAN:
    - Conversion to Swan does not recognize "bodemhoogte" in the Grevelingen model. This can be avoided by mixing the "Grevelingen" model in a different model and remove the *section_polygons* of that model.
    - Conversion to SWAN is not stable in various cases:
        - This might be a result of multiple separated polygons in the *section_polygons* featureclass; Baswaq is not able to deal multiple polygons. Check this prior to conversion by making a copy of *section_polygons*, dissolve all features to one polygon and exploding it again. This should result in one polygon only. If not delete the redundant polygons from *section_polygons* in the original Baseline database. Or correct the *Baseline_clip_contour* used to construct the variant database.
        - Also, it is recommended to clip or merge the source database to an extent equal to the SWAN model. this prevents that an overload of data have to be converted by Baswaq which might result in errors.
    - Conversion to SWAN of the newly added *terrain_jump_3d_lines*, *flow_blocking_lines* and *flow_blocking_polygons* to *Fixed weirs* result in very many *Fixed weirs* which increases the SWAN calculation time. This problem will be addressed in the next release.

6 Overview of improvements (on reported bugs)

This overview is for the user who reported a bug in a previous release and wants to check whether it has been fixed.

The following improvements (in the application or the documentation) have been achieved compared to the previous release (Baseline 6.3.1):

Issue key	Summary
BASELINE-861	bodem wordt niet herkend bij conversie naar SWAN *Dit is niet oplosbaar*
BASELINE-893	foutmelding in Merge land and Sea
BASELINE-906	symbology output_location_points is vreemd op Horizon node. *Dit is niet oplosbaar, is een artifact van ArcGIS*
BASELINE-943	Contentcheck geeft onterecht fouten
BASELINE-945	Contentcheck: Puntenshape aanmaken bij dubbele punten met andere kruinhoogte. *Is uitgesteld naar de volgende release voor elevated_lines; geadministreerd onder BASELINE-1007. Voor hoogtelijnen binnen het hoogtemodel is dit wel toegevoegd.*
BASELINE-967	nieuwe fout bij uitpakken netcdf
BASELINE-968	Probleem met installatie van Baseline 6.3.1 *Heeft geleid tot een verbeterde "Baseline 6 Installation Manual".*
BASELINE-971	"Convert netCDF to Bas2FM input" tool in Bas2FM tool doesn't process
BASELINE-972	Als Gebruiker Wil Ik een ingreep kunnen beoordelen ikv. Vergunningsverlening
BASELINE-973	Route en Event zijn niet aan elkaar gekoppeld
BASELINE-975	Ambigue melding in de log-files na Content check op een maatregel
BASELINE-976	Compatibility check on D-HYDRO Suite 2023.01
BASELINE-978	Wens: Graag de *gen en *asc- files verwijderen als de projectie tot een goed einde is gekomen
BASELINE-979	Wens: kan er niet vooraf gecheckt worden of de omhullende van het sectie-bestand uit 1 polygoon bestaat?
BASELINE-980	Bij het openen/inlezen van bodemdata van een samengestelde baseline-boom, lijken terrain/raster punten niet correct te zijn. *Hiervoor is een work-around, welke staat beschreven onder "Known issues".*
BASELINE-991	Verwijzing naar User map gaat niet goed
BASELINE-993	Tool 9 werkt niet op bridge_events
BASELINE-994	vraag over calibration_section_input_polygon
BASELINE-995	Contentcheck op maatregelnaam in measure_contour lijkt niet goed te werken
BASELINE-1003	Error Protocolcheck
BASELINE-1005	Templates niet gevonden converter
BASELINE-1008	Aanpassen Contentcheck
BASELINE-1009	Baseline invoer module set to elevation