Coastal Erosion from Space

Annex 1 – The Products

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Version and Signatures

Version	Date	Modification
Verification by		
Authorisation		

Acronyms

Applicable and reference documents

Id	Description	Reference
AD-1	Requirement Baseline Document	SO-RP-ARG-003-055-006-RBD_v1.0_20190916
AD-2	Technical Specifications Document (Version 2)	SO-TR-ARG-003-055-009-TSD

1 Product List

EO products naming	Description	Processor
CE_date_WL_OB_L2_bbox_sensor.shp	: Observed waterline from a single optical snapshot for a specific bbox and date	SDW-OPT
CE_date_WL_OB_L2_bbox_S1.shp	: Observed waterline from a single Sentinel-1 snapshot for specific bbox and date	SDW-SAR
CE_date_SL_DB_L2_bbox_MHWS.shp	: Corrected waterline to MHWS (mean high water spring)	SDS
CE_date_SL_DB_L2_bbox_MSL.shp	: Corrected waterline to MSL (Mean Sea Level)	SDS
CE_date_SL_DB_L2_bbox_MLWN.shp	: Corrected waterline to MLWN (Mean Low Water Neap)	SDS
CE_date_SL_DB_L3_bbox_MHWS_date.zip*	: Time-series of corrected waterline to MHWS	POST
CE_date_SL_DB_L3_bbox_MSL_date.zip*	: Time-series of corrected waterline to MSL	POST
CE_date_SL_DB_L3_bbox_MLWN_date.zip*	: Time-series position of the MLWN	POST
CE_date_BT_OB_L2_bbox_sensor.tif	: Bathymetry chart from a single optic EO product (classic SDB).	SDBTM
CE_date_BT_OB_L3_bbox_sensor_date.tif	: Time-series & merged chart from several SDB / optic EO products	SDBTM
CE_date_BT_WF_L2_bbox_sensor.XXX	: Seafloor morphology and depth from a wave field analysis from a single SAR snapshot. If sensor is VHR includes slope.	SDBTM
CE_date_BT_WF_L3_bbox_sensor_date.XXX*	: Time series of seafloor morphology and depth from a wave field analysis of SAR snapshots. If sensor is VHR includes slope.	POST
CE_date_BT_MX_L4_bbox_MX_date.tif	: Seafloor morphology and depth from a fusion between SDB chart and wave field analysis from a time series	SDBTM
CE_date_LC_FB_L2_bbox_sensor.tif	: Land Cover map from a single EO product	SDF
CE_date_LL_FB_L2_bbox_sensor.shp*	: Littoral line (between backshore and littoral) extracted from a Land Cover map from a single EO product	SDF
CE_date_SF_FB_L2_bbox_sensor.shp*	: Seafront line (just in case of an inter zone) from a Land Cover map from a single EO product	SDF
CE_date_LC_FB_L3_bbox_sensor_date.tif	: Land Cover map from a time series of EO optical products	SDF
CE_date_LL_FB_L3_bbox_date.zip*	: Littoral line (between backshore and littoral) extracted from a Land Cover map from a time-series	POST
CE_date_SF_FB_L3_bbox_date.zip*	: Seafront line (just in case of an Inter zone) from a Land Cover map from a time series	POST
CE_date_SR_MB_L4_bbox_date.XXX CE_date_ER_MB_L4_bbox_date.XXX	: Volume changes on the littoral between two observation time	SDER

* These are not separate products, but collections of products, generated on-demand by the data portal. Multiple shapefiles delivered as a zip archive.

2 Level 2 Products.

2.1 CE_**date**_DL_FB_L2_**bbox_sensor**

Service Provider	ARGANS	**Expert User**	BGS
Product requirements			
The mean high-water mark is required by end-users to quantify trends in coastal erosion. This product creates a coastal erosion baseline. High water mark is characterized by the debris carried by waves backshore and left there due to a lack of energy. The mean high-water mark, or debris line, should be extracted from single EO product classification, CE_**date**_LC_FB_L2_**bbox_sensor**			
Process design			
Line will be extracted from an intermediate product: CE_**date**_LC_FB_L2_bbox_**sensor** on which should appear a misclassified line on the beach bbox. The line will be extracted with edges detection methods.			
Inputs			
• CE_**date**_LC_FB_L2_**bbox_sensor**			
Current status			
• The classification processing is done by the IOTA^2 platform, which is system ready. • Tests over Barcelona show that the processor is able to delineate the different bbox of interest (backshore, intermediate –if exist, and littoral)			
Outstanding Issues			
• A short programme needs to be developed to create a binary image out of the classified image (littoral zone and backshore). ○ This should be done automatically and parameterised by the different environments longshore. • The debris line is a thin bbox on beach where some plastics, woods and other objects are rejected. According to the situation, this line may be too thin to be detected on satellite HR (and even VHR) data, or debris are too sparse and doesn't significantly change the beach spectral respond to be able to detect it.			

Outputs	
• CE_**date**_DL_DB_L2_**bbox_sensor**	• CSI position: Debris line on beach bbox which characterized the mean high-water mark, derived from classification map from a single EO sample.
Product validation	
Validation will be performed by the end user from in-situ data (i.e. positions of seafront at given observation periods) as proof of concept.	

2.2 CE_**date**_LL | SF_FB_L2 _**bbox_sensor**

Service Provider	ARGANS	**Expert User**	BGS
Product requirements			
This product is a line extracted from a single EO product observation. This line is used to delineate the private sector from the public one. This line can be physically described as the line drawn by the vegetation or by civil works infrastructure between inland and the littoral. This product is similar to the one described in section 4.2.6.			
Process design			
Lines will be extracted from an intermediate product: CE_**date**_LC_FB_L2_**bbox_sensor** According to the type of habitat, littoral limit will be extracted from the boundary between littoral and backshore zone or between littoral and intermediate zone (if there is one). In the latest case an extra line will be extracted between intermediate and backshore zone.			
Inputs			
• CE_**date**_LC_FB_L2_**bbox_sensor** • Training data set from CE_**date**_LC_FB_L2_**bbox_sensor** product			
Current status			

• The processing is done by the IOTA^2 platform, which is system ready. • Tests over Barcelona show that the processor is able to delineate the different bbox of interest (backshore, intermediate –if exist, and littoral)
Outstanding Issues
• A short programme needs to be developed to create a binary image out of the classified image (littoral zone and backshore).   ○ This should be done automatically and parameterised by the different environments longshore.
Outputs

• CE_**date**_LL | SF_FB_L2 _**bbox_sensor**	• CSI position: boundary between the Littoral Zone and the Backshore, derived from classification map from a single EO sample.

Product validation
Validation will be performed by the end user from in-situ data (i.e. positions of seafront at given observation periods) as proof of concept.

2.3 CE_**date**_L2_OB_WL_**bbox_sensor**

Service Provider	ARGANS	**Expert User**	ARCTUS
Product requirements			
The proxy-based shoreline indicator (waterline) product is based on EO data for a 25-year period; derived using different spectral properties of optical data sets and exploiting data at different resolutions. The product is the instantaneous wet/dry line at the boundary of the sea and land, providing an instantaneous shoreline proxy. It is computed using a locally adaptive thresholding method on spectral indices created based on the EO products: NDVI, GNDVI, etc. according to the specificities of the region of interest (presume knowledge of the operator). Waterlines will be extracted annually or seasonally according to erosion rate to develop regular maintenance works and around storm-events to improve short-term response and emergency works. Waterlines will be vectorized and will be available on a geoportal.			
Process design			
Waterline processor is designed to process data from different sensors, a standardisation step is needed to fit data from different sensors to the right format. Users can choose a specific band ratio to apply to the image or by default the processor will compute a BNDVI image. This ratio image will allow us to extract a rough coastline using a fix threshold, this coastline is a “guide” along which a small kernel slides to produce			

a more precise waterline using an adaptive threshold. Edge detection methods extract the produced waterline and a vectorization will save the waterline in vector format.

Inputs

EO product

- Pre-processed optical images from Sentinel 2 and Landsat 5,7 and 8;
- Potential use of commercial satellites (VHR) to compare results.

Auxiliary Data Requirements

- Rough coastlines in ESRI shapefiles to improve efficiency of waterline computation (optional).

Current status

- EO processor currently working with Sentinel 2 and Maxar VHR datasets;
- Work in progress on addressing issues arisen, see details below.

General issues

- Work needs to be completed to convert the code to accept Landsat 5 and non-Maxar VHR data (e.g. Pleiades and SPOT);
- Need to further assess the suitability of band ratios used – which one performs best considering the specificities of the study locations;
- Continuity of computed waterline under certain environmental conditions is not guaranteed – further work is needed to address the causes of gaps;
- Related to the continuity issue – also need to address false edges due to:
  - Sediment load;
  - White water;
  - Nearshore bathymetry;
- Tiles with snow and/or sea ice will be excluded from the analysis as the processor is unable to handle the presence of these phenomena due to the methods it is built on;
- Since the process is based on optical EO data, it is limited by the presence of clouds.

Outputs

• CE_**date**_L2_OB_WL_**bbox_sensor**.shp	• CSI Position: Proxy based waterline

Product validation

Performed by end users as part of a proof-of-concept validation process designed by them, with diverse forms of in situ data from coastal surveys as inputs.

2.4 CE_**date**_WL_OB_L2_**bbox_sensor**

Service Provider	IsardSAT	**Expert User**	
Product requirements			
The proxy-based shoreline indicator (waterline) product is based on EO data for a 25-year period; derived using different spectral properties of optical data sets and exploiting data at different resolutions. The product is the instantaneous wet/dry line at the boundary of the sea and land, providing an instantaneous shoreline proxy. Waterlines will be extracted annually or seasonally according to erosion rate to develop regular maintenance works and around storm-events to improve short-term response and emergency works. Waterlines will be vectorized and will be available on a geoportal.			
Process design			
To be completed			
Inputs			
Current status			
•			
Outstanding Issues			
○			
Outputs			
• CE_**date**_WL_OB_L2_**bbox_sensor**		• CSI Position: Proxy based waterline	
Product validation			

2.5 CE_**date**_BP_OB_L2_**bbox_sensor**

Service Provider	ARGANS	**Expert User**	ARCTUS

Product requirements	
The need of information about beach slope is necessary for all stochastic estimation. This intermediate product will be used in input of the stochastic estimation processor. Slope information is necessary for all volumetric calculations.	
Process design	
CE_**date**_BP_OB_L2_**bbox_sensor**.tif product, SDB output is a raster which each pixel contains an information about depth. In order to extract slope information from it the processor need to: • Read SDB product • Get land direction/position • Extract pixels information along the transept from the depth of closure to the waterline. We can obtain an information about the slope thanks to the different depth store in the extracted pixels.	
Inputs	
EO product • SDB product: CE_**date**_BT_OB_L2_**bbox_sensor**.tif • Waterline: CE_**date**_WL_OB_L2_**bbox_sensor**.shp **Auxiliary Data Requirements** • Depth of closure information (to be provided by users), to define the seaward limit of bbox of interest. • Reference chart data.	
Current status	
• SDB processor is able to determine depths • Processor need to be developed to determine the slope of the seabed • **Noise**	
General issues	
• Errors and uncertainty of the SDB product are important • Raster out of the SDB process is very noisy, from one pixel to another the store depth value may not be continue. • With the processor available at the moment the error introduced would be too high with respect to the actual measurement that any slope or depth information would be lost.	
Outputs	
• CE_**date**_BP_OB_L2_**bbox_sensor**	• Cross shore profile: Slope characteristics at defined transect positions.
Product validation	

Performed by end users as part of a proof-of-concept validation process designed by them, with diverse forms of in situ data from coastal surveys as inputs.

2.6 CE_**date**_SL_DB_L2_bbox_MHWS | MSL | MLWN.shp

Service Provider	ARGANS	**Expert User**	IHC
Product requirements			
Datum-based shoreline indicators (DSI's) provide defined shoreline positions between the Mean High Water Mark (MHWM) and Mean Low Water Mark (MLWM). The products are created from waterlines (developed by a previous processor) and a full suite of auxiliary metocean data. The DSI's will be created accompany to every waterline produced. As such, the frequency of DSI production depends on the frequency of waterline production outlined in section 4.2.3. The product is a series of line shapefiles corresponding to the individual DSI's. The lines are compatible with GIS software like ArcGIS and QGIS.			
Process design			
The processor uses the waterline as a primary input with various pieces of auxiliary data (listed below) used to calculate the waterline elevation. This is done by calculating the elevation of the waterline above the predicted tidal height. This residual value combined with the predicted tide determines the elevation of the waterline. Then, assuming a constant slope across the cross-shore profile, the lateral distance between the waterline and the tidal datums is determined through trigonometric calculations. This lateral distance is then used to construct a new line parallel to the waterline corresponding to the specific DSI.			
Inputs			

EO product
 	
• Waterline product: CE_**date**_WL_OB_L2_**bbox_sensor**
 	
Auxiliary Data Requirements
 	
• Sea State
  ○ Harmonic Tidal Prediction
  ○ Sea Level Datum Heights
  ○ Atmospheric Pressure at MSL
  ○ Surface / 10 m Wind Speed
  ○ Deep Water Wave Spectra + Direction
  ○ Regional rate of Relative Sea Level Rise
• Beach Morphology
  ○ Beach Slope / Beach Cross-Shore profiles
  ○ Beach Sediment Grain Size (As a proxy to obtain beach slope)			

Current status	
• As the waterlines are a prerequisite to the processor, production of this processor will begin once waterlines are provided.	
General issues	
• Accumulation of uncertainties and errors associated with combining a large variety of metocean data is likely to dramatically increase the overall uncertainty of the final product. This may be further amplified when using metocean model outputs rather than in-situ data. • The processor relies heavily on the output of the waterline processor, any errors and uncertainty created by this process will be carried forward to the production of the shorelines. • The algorithm requires an accurate measurement of the beach slope. This may be difficult to source. Furthermore, the algorithm assumes a constant slope, which may not be representative of the actual beach configuration and could cause error in the calculation of DSI position.	
Outputs	
• CE_**date**_SL_DB_L2_**bbox**_MHWS.shp • CE_**date**_SL_DB_L2_**bbox**_MSL.shp • CE_**date**_SL_DB_L2_**bbox**_MLWN.shp	• CSI Position: Datum based tidelines
Product validation	
Validation is done by the end user using known locations of DSI's.	

2.7 CE_**date**_LC_FB_L2_**bbox_sensor**

Service Provider	ARGANS	**Expert User**	ARCTUS
Product requirements			
• Classification map from a single EO product • Automatic land cover classification of the coastline, including the littoral zone and backshore bbox in the immediate vicinity to the seafront (Littoral Limit). • Classification provides information to derive the boundary between Littoral zone and Backshore, as a boundary described as the Littoral Limit. • Classification map will be used to extract seafront line, product CE_date_LL_FB_L2_bbox_sensor and CE_**date**_SF_FB_L2_**bbox_sensor** • The classification map is therefore an intermediate product which will be delivered to the end-users as they express their interest for it.			
Process design			
• Land cover identification by eye to build a training set in adequation with the land cover. • Iota^2 processing chain:			

○ computation of the validity masks from cloud cover map and land use classification from L2 product for sentinel-2 imagery. ○ Sample extraction and splitting in two part for training and validation ○ Classification model computation using features information from training set ○ Use of the validation set for validation statics from the classification obtained. • Zone identification for littoral line extraction.
Inputs
EO product • Pre-process optical images (all L5 and S2) **Auxiliary Data Requirements** • Training data set
Current status
• Band ratio like NDVI, BNDVI, ect., improve the classification process • We use a random forest algorithm • Need to perform the extraction process
Outstanding Issues
• A short programme needs to be developed to create a binary image out of the classified image (littoral zone and backshore). ○ This should be done automatically and parameterised by the different environments longshore.
Outputs

• CE_**date**_LC_FB_L2_**bbox_sensor**	• Classification map: land cover types and ecosystems derived from a combination of multiple EO observations during a given period (season)

Product validation
Validation will be performed by the end user from in-situ data (i.e. positions of seafront at given observation periods) as proof of concept.

2.8 CE_**date**_BT_OB_L2_**bbox_sensor**

Service Provider	ARGANS	**Expert User**	ARCTUS

Product requirements
SDB enables to determine depths and other seabed features of coastal marine environments by measuring the reflectance of the sea bottom extracted from the upwelling light signal. The SDB processor is required to assess geomorphic change and volumes of sediment eroded and deposited by subtraction of two independent DTM surfaces to produce a DTM of Difference (DoD), with each grid cell value representing a measure of the vertical elevation difference.
Process design
The SDB processor is designed to process data performing multiple steps: • Deglint. • Atmospheric Correction. • Bathymetry; using a model inversion method spectral radiance distribution are computed for natural water bodies as a function of depth and direction. The models also take into account the absorbing and scattering properties of the water body and the reflectance of sea-bottom boundary.
Inputs
EO product • Sentinel 2 – Level 1C data; • Land mask; • Cloud and boat mask. **Auxiliary Data Requirements** • Depth of closure information (to be provided by users), to define the seaward limit of bbox of interest. • Reference chart data. • Tide gauge data. • Wavefield, wind and swell data. • Sampling rate definition.
Current status
• EO processor currently working with Sentinel 2 – Level 1 data and VHR data (WorldView-n, Pleiades, etc.); not yet tested with Landsat.
General issues
• Need of Sentinel-2 level 1 products and others • Cloud and boat masking must be performed manually, and they are both not automated processes; • The models used for the atmospheric correction are generally not able to give a good representation of the atmospheric conditions present in the studied bbox; • Similar reflectance can be consistent with different depths. Pure water has a distinctive spectral attenuation that varies over several orders of magnitude in the visible range from clearest

wavelengths (blue-green) to being close to opaque in the NIR, whether constituents such as chlorophyll, coloured dissolved organic matter (CDOM) and suspended sediments effect the attenuation and backscatter of the water column; • The processor is limited to GDAL images; • Depth information can be lost when processing regions with big sediment concentration.
Outputs

• CE_**date**_BT_OB_L2_**bbox_sensor**.tif	• Difference detection: comparison of nearshore morphology between reference data and optical SDB.
Product validation	
Performed by end users as part of a proof-of-concept validation process designed by them, with diverse forms of in situ data from coastal surveys as inputs.	

2.9 CE_**date**_BT_WF_L2_**bbox_sensor**

Service Provider	IsardSAT	**Expert User**	
Product requirements			
Process design			
•			
Inputs			
Current status			
•			
General issues			
•			
Outputs			
•		•	
Product validation			

3 Level 3 Products

3.1 CE_**date**_LL | SF_FB_L3_**bbox_date**

Service Provider	ARGANS	**Expert User**	ARCTUS
Product requirements			
Littoral Limit is characterized by vegetation line, or rocky escarpments in semi-natural environments and the sea wall or sealed surface in urban bboxs, it is the line at the boundary between what is commonly called beach and the rest of the land. Littoral limit position and 2D LULC map products, will be produced annually even maybe seasonally from HR and VHR data. Littoral line will consequently be a fitted line from the sample of images used for the classification process. Lines will be produced for each location sites over the past 25 years.			
Process design			
Lines will be extracted from an intermediate product: CE_**date**_LC_FB_L3_**bbox_sensor_date** According to the type of habitat, littoral limit will be extracted from the boundary between littoral and backshore zone or between littoral and intermediate zone (if there is one). In the latest case an extra line will be extracted between intermediate and backshore zone.			
Inputs			
Temporal classification map and training set from: CE_**date**_LC_FB_L3_**bbox_sensor_date**			
Current status			
• The processing is done by the IOTA^2 platform, which is system ready. • Tests over Barcelona show that the processor is able to delineate the different bbox of interest (backshore, intermediate –if exist, and littoral)			
Outstanding Issues			
• A short programme needs to be developed to create a binary image out of the classified image (littoral zone and backshore). ○ This should be done automatically and parameterised by the different environments longshore.			
Outputs			

• CE_**date**_LL_FB_L3_**bbox_date** • CE_**date**_SF_FB_L3_**bbox_date**	• Mean-position CSI: boundary between the Littoral Zone and the Backshore from classification maps built from multiple EO products from the same satellite mission.
Product validation	
Validation will be performed by the end user from in-situ data (i.e. positions of seafront at given observation periods) as proof of concept.	

3.2 CE_**date**_LC_FB_L3_**bbox_sensor_date**

Service Provider	ARGANS	**Expert User**	ARCTUS
Product requirements			
• Automatic land cover classification of the coastline, including the littoral zone and backshore bbox in the immediate vicinity to the seafront (Littoral Limit). • Classification provides information to derive the boundary between Littoral zone and Backshore, as a boundary described as the Littoral Limit. • Classification map is a temporal product, produced from a seasonal or annual stack of images. • The classification map is therefore an intermediate product which will be delivered to the end-users as they express their interest for it.			
Process design			

• Land cover identification by eye to build a training set in adequation with the land cover.
• Iota^2 processing chain:
  ○ computation of the validity masks from cloud cover map and land use classification from L2 product for sentinel-2 imagery.
  ○ Sample extraction and splitting in two part for training and validation
  ○ Classification model computation using features information from training set
  ○ Use of the validation set for validation statics from the classification obtained.
• Zone identification for littoral line extraction.			

Inputs			
EO product • Pre-process optical images (all L5 and S2) **Auxiliary Data Requirements** • Training data set			

Current status	
• Band ratio like NDVI, BNDVI, ect., improve the classification process • We use a random forest algorithm • Need to perform the extraction process	
Outstanding Issues	
• A short programme needs to be developed to create a binary image out of the classified image (littoral zone and backshore). ○ This should be done automatically and parameterised by the different environments longshore.	
Outputs	
• CE_**date**_LC_FB_L3_**bbox_sensor_date**	• Classification map: land cover types and ecosystems derived from a combination of multiple EO observations during a given period (season)
Product validation	
Validation will be performed by the end user from in-situ data (i.e. positions of seafront at given observation periods) as proof of concept.	

3.3 CE_**date**_SL_DB_L3_**bbox**_MHWM_**date**

Service Provider	ARGANS	**Expert User**	
Product requirements			
The product is a time-series of shoreline positions created from numerous shorelines corresponding to the same tidal datum (MHW or MLW), a mean shoreline position, and assessments of linear and volumetric erosion rates. The product requires tidal datum-based shorelines indicators CE_**date**_SL_DB_L2_**bbox**_MHWM and beach slope information CE_**date**_BP_BT_L2_**bbox** _**sensor** as input data. The product is a line shapefile corresponding to the individual DSI's. The lines are compatible with GIS software like ArcGIS and QGIS.			
Process design			
The processor will first find shorelines that correspond to the MHW/MLW mark. These shorelines will then be filtered to find shorelines which were recorded when the waterline elevation was as close to the elevation of MHW/MLW as possible. These shorelines will ideally be clustered and come from EO products that were recorded with minimum temporal spacing to reduce any bias caused by sudden morphological			

changes (i.e storm erosion). Next, at each point along the shorelines, the lateral distances between the shoreline points are averaged. This creates an average shoreline position. The erosion rates are then calculated.

Inputs

EO product

- Tidal-datum based shoreline indicators CE_**date**_SL_DB_L2_**bbox**_MHWM
- Shore slope information CE_**date**_BP_BT_L2_**bbox_sensor**

Auxiliary Data Requirements

- N/A

Outstanding Issues

- Using EO snapshots clusters taken during storm events will create bias in the mean shoreline position due to acute erosion changing the position of the shorelines post event.
- Using shorelines derived from waterlines with elevations too far the datum elevation will lead to large uncertainties arising from the assumption of uniform beach slope (S*ee 4.2.5. Outstanding Issues*)

Outputs

• CE_**date**_SL_DB_L3_**bbox**_MHWM_**date**.	• CSI: Mean Shoreline Position according to a time series analysis

Product validation

Validation is done by the end user using known locations of DSI's corresponding to the time frame in which the EO used to create the shorelines was acquired.

3.4 CE_**date**_BT_OB_L3_**bbox_sensor_date**

Service Provider	ARGANS	**Expert User**	ARCTUS

Product requirements

Snapshots processed for different dates and times can be merged into a single layer in order to produce seasonal SDB charts and to reduce the noise associated with the individual images.

Process design

The merging product consists of a script that has as input multiple images processed with the SDB processor and it allows the user to choose between these different averaging types: arithmetic average, root mean square, uncertainty weighted average, distance with others weighted average, range intersection.

Inputs	
• CE_**date**_BT_OB_L2_**bbox_sensor**	
Current status	
• The processor is currently working with SDB processed images.	
General issues	
• All the issues related to the SDB. • The choice of the average type changes the accuracy of the output, which strongly depends on the input images.	
Outputs	
• CE_**date**_BT_OB_L3_**bbox_sensor_date**	• result of data fusion of BTM/SDB on a data sets of snapshots in the Δt time interval
Product validation	
Performed by end users as part of a proof-of-concept validation process designed by them, with diverse forms of in situ data from coastal surveys as inputs.	

3.5 CE_**date**_BT_WF_L3_**bbox_sensor_date**

To be included within V2. Result of data fusion of BTM/WF on a data sets of snapshots in the Δt time interval

4 Level 4 Products.

4.1 CE_**date**_BT_MX_L4_**bbox_MX_date**

To be included within phase 2. Result of data fusion BTM/SDB and BTM/WF on a data sets of snapshots from different EO missions in the Δt time interval

End of Document