SUPPLEMENTARY MATERIALS: DETAILS ON THE PRE-ANALYSIS STEP OF THE SATELLITE DERIVED BATHYMETRY SCRIPT AND APPLICABLE TUTORIAL

DETAILS ON THE PRE-ANALYSIS

As described in the general description of the script, pre-analysis is needed if m1 and m0 are unknown. Therefore, in step 6.b) of the INPUT SETTINGS of the script, user sets

var preAnalysis=true;

In this case then user needs to have available depths for at least 5 to 10 points. It is recommended that this points are part of bathymetry cross section with variable depths (e.g. from 0 to 18 meters). For latter points, we also need calculated *pSDB* values of pre-analysis. We can get that from green or red channel values of pre-analysis output.

For green channel, *pSDB* value multiplied by multiplier (*pSDB*mp*) is the output. Multiplier is a workaround for EO Browser return values in statistical information for Point of Interest, which have originally only number precision 2. Therefore, first method to obtain *pSDB* values is to do that for known depth locations in EO Browser with “Mark Point of Interest” and “Statistical Info” and retrieve green channel value (C01). Second method to obtain *pSDB* values for known points with depth is to get values of red channel in pre-analysis. Red channel value has clamped *pSDB* values accordingly to *pSDBmin* and *pSDBmax*. In this method, red channel value is obtained with various GIS software (SAGA, QGIS, etc.). Pre-analysis output can be imported to GIS software via EO Browser Download Image with georeference or by OGC web services (WMS, WMTS, WCS). Thus, clamped pSDB values in red channel can be obtained.

Obtained *pSDB* values for points with known depths must be appropriately adjusted back to “true” values because of multiplier or clamped output in pre-analysis. Then, true *pSDB* values with known depths are used in linear regression to obtain tunable contants *m1* and *m0*. After that, user can set

preAnalysis=false;

and set obtained *m1* and *m0* values.

TUTORIAL: PRE-ANALYSIS WITH MULTIPLIED pSDB VALUE IN GREEN CHANNEL OUTPUT AND LINEAR REGRESSION FOR THE NORTHERN ADRIATIC SEA

In this tutorial, pre-analysis procedure for the northern Adriatic Sea (The Gulf of Trieste) is described. Procedure is done for green channel output as multiplied pSDB value. Selected scene is for 2019-08-09 in data source Sentinel-2 L1C.

1. Input settings

INPUT SETTINGS in the script are hereinafter.

scenes value is only applicable in case of multi-temporal analysis, therefore value in this tutorial has no effect on the result.

```
////// INPUT SETTINGS
//// 1. Select MULTI-TEMPORAL SCENES (Playground)
var scenes = ["2019-08-09"];
```

```
//// 2. Set water surface detection THRESHOLDS
//Calibration might be needed, depends on the scene
var MNDWI_thr=0.42;
var NDWI_thr=0.4;
//// 3. Turn on/off filtering of false water surface detections
//urban areas&bare soil. Recommended=true
var filter_UABS=true;
//shadows&snow/ice. Recommended=false
var filter_SSI=false;

//// 4. Set bands RATIOS to calculate SDB
//SDB can be blue/green (true) or blue/red (false,aka SDBred)
//Generally SDBred is better for depth<5m and SDBgreen is better for depth>5m
var SDBgreen=true;

//// 5. Select visualization scheme SDB
//0-blue ramp,1-blue blend,2-blueBlack blend
var cs=0;
```

m1 and *m0* are unknown, therefore:

```
//// 6. IMPORTANT! a.) false - if m1 and m0 already known OR b.) true - pre-analysis to evaluate m1 and m0
var preAnalysis=true;
```

For pre-analysis other settings are also applicable, which usually, can have default values:

```
// 6.b) If m1 and m0 unknown, preAnalysis=true (above) and pre-analysis of pSDB is necessary to evaluate m1 and m0! This step is done "off the platform" (EXAMPLE TUTORIAL IN SUPPLEMENTARY MATERIAL). In this case mp, pSDBmin, pSDBmax, nConst are applicable
//multiplier for pSDB output value in GREEN CHANNEL, recommended 1000
var mp=1000;
//pSDBmin,pSDBmax are clamped output range [0-1] of Sentinel Hub in READ CHANNEL
//Recommended 0.201 and 4.983 - theoretical minimum and maximum values of pSDB. If higher accuracy is needed, values 0.565 and 1.769 might be appropriate too. For latter, color values range of pSDB is bigger
var pSDBmin=0.201; // pSDB<=pSDBmin -> Sentinel Hub returns 0 for red channel
var pSDBmax=4.983; // pSDB>=pSDBmax -> Sentinel Hub returns 1 for red channel
//pSDB calc. parameter, recommended 1000. Assures that both logarithms will be positive and that the ratio produces a linear response over the retrievable water depth
var nConst=1000;
```

Input settings above produce following result in EO Browser.

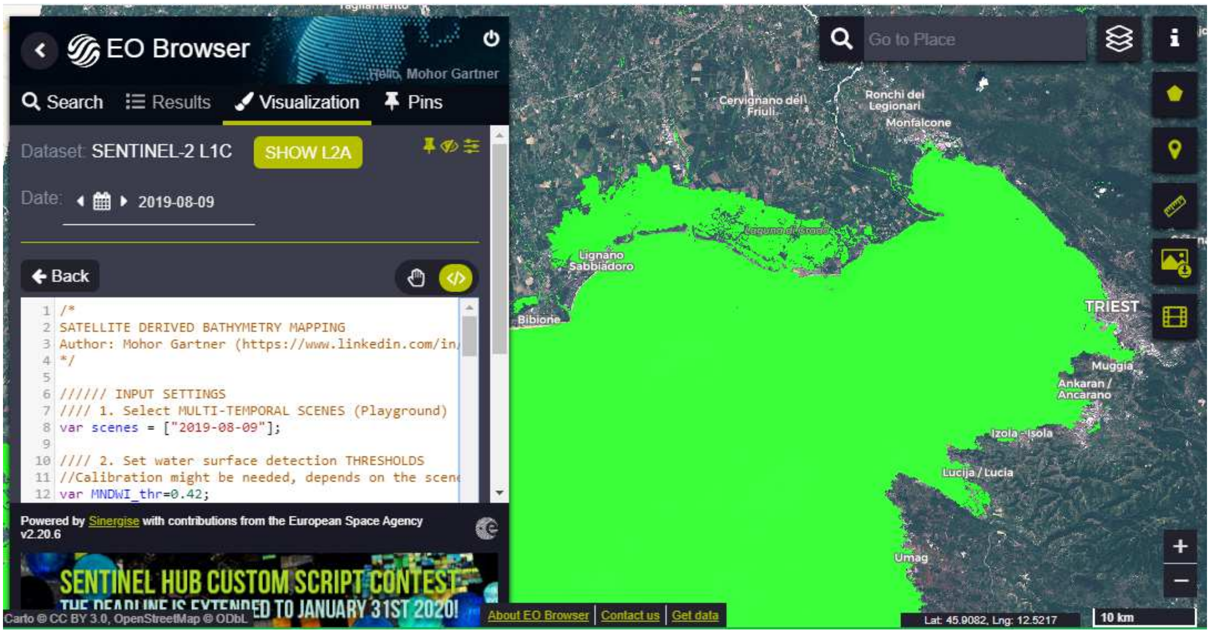


Figure 1: Script result with above input settings for Satellite Derived Bathymetry Script for Sentinel-2 L1C image for 2019-08-09.

You can find link to the scene in EO Browser under references.

2. Extraction of depth location for the analysed area

Nowadays, bathymetry is usually measured with remote sensing (sonar, special LIDAR). Nevertheless, for the satellite derived bathymetry, also in-situ measurements can be useful. For the example area of the Gulf of Trieste, bathymetry model (50m x 50m) and contours were created on the basis of various measurements (Trobec and Busetti, 2017; Trobec et. al, 2018).

On the basis of contours, 5-10 points can be extracted with various depths from 0 to 18 meters. This can be done with Google Earth Pro. Firstly, contours are imported with **File\Open** and select **Bathymetry_1m.shp**.

Individual contour depth can be shown with Left click on the Contour (ELEV attribute).

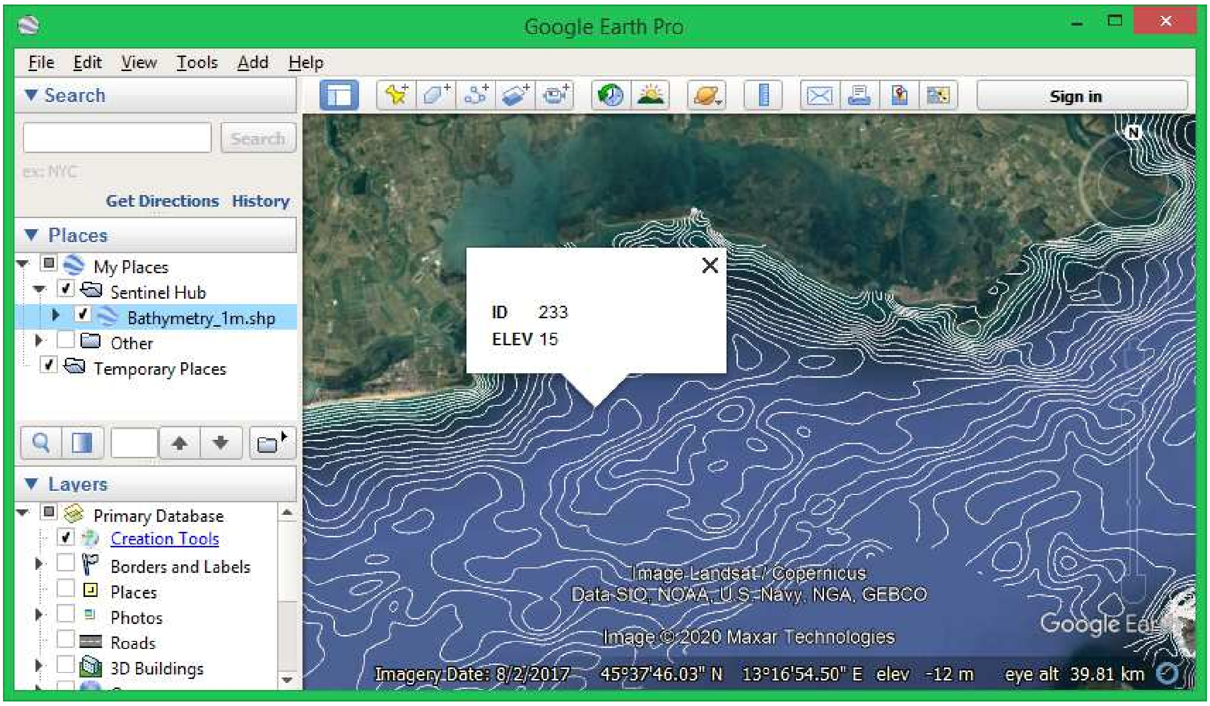


Figure 2: Importing bathymetry contours into Google Earth Pro.

It is recommended to select representative cross-section with various depth. Cross section can be drawn. Do following:

Use tool **Add Path**. Use Left click for start and end of the cross-section. Save with the name Cross-Section.

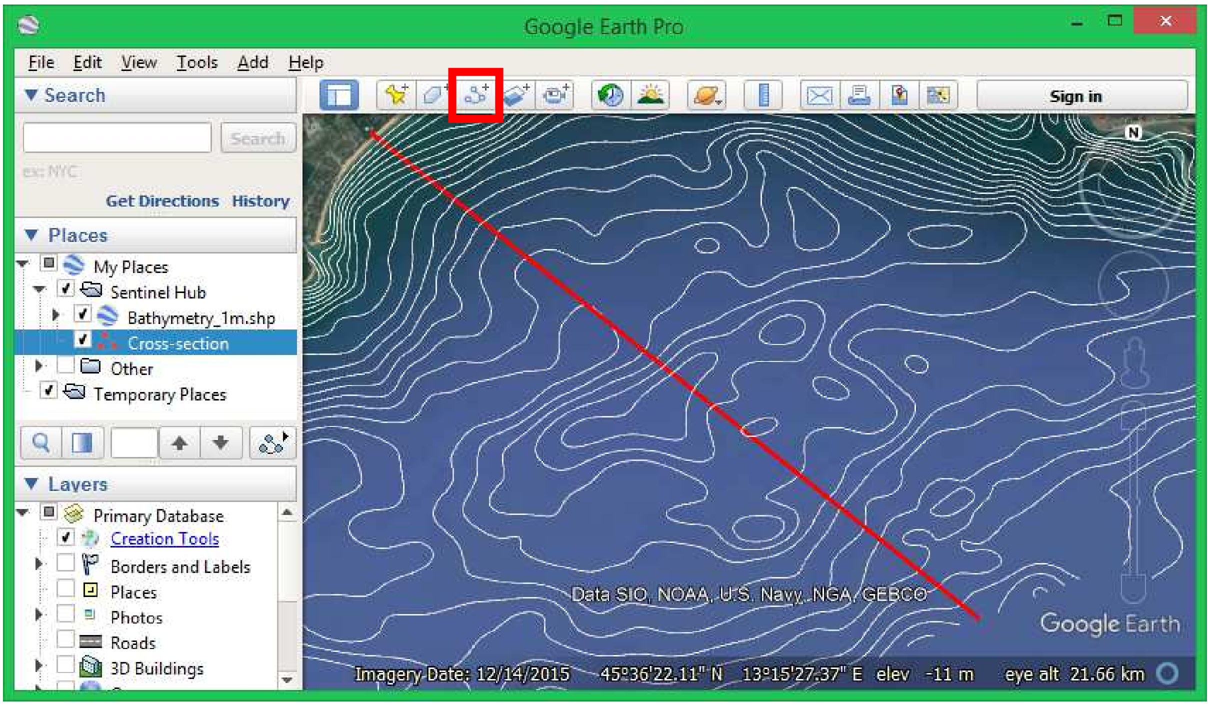


Figure 3: Cross-section drawing.

Now location with selected depths can be extracted for EO Browser. In this case we will select 9 points with depths: 1, 2, 3, 6, 9, 12, 14, 16 and 18 meters. As EO Browser can only import polygon shape (area of interest). Therefore zig-zag polygon is created in Google Earth Pro.

Use tool **Add Polygon**. Save the polygon with name Point-Polygon.

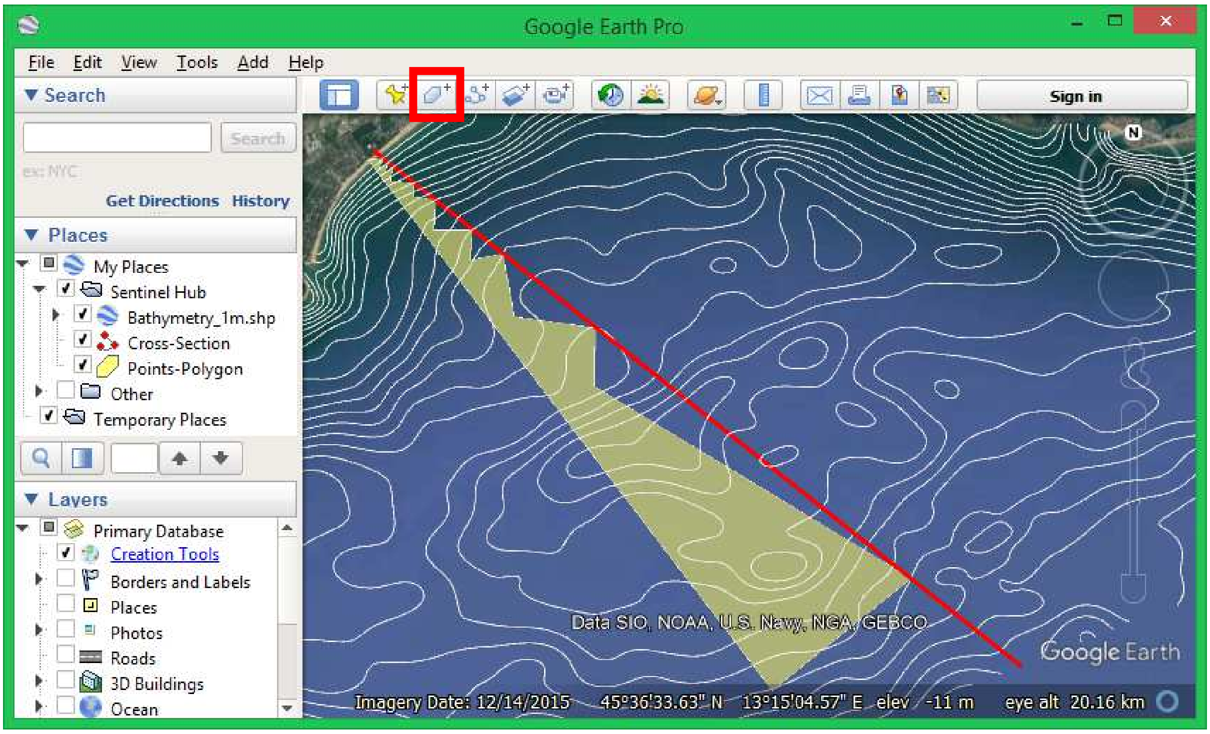


Figure 4: Zig-zag polygon for representation of selected depth locations.

Right click on the layer Points-Polygon and select **Save Place As…** Save as kmz.

3. Extraction of pSDB data for depth locations

Go to EO Browser with the former created scene. Or copy and paste the URL of the scene to browser (URL link under references).

Hover **Draw Area of Interest** button  and left click on **Upload Data** button . Upload the created kmz file.

EO Browser will zoom to the imported polygon.

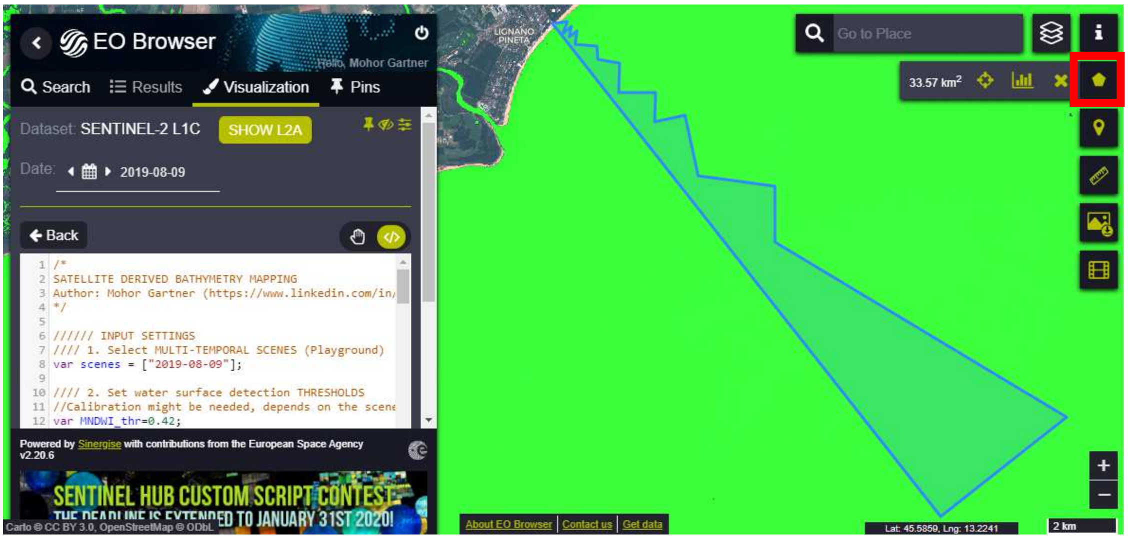


Figure 5: Imported zig-zag polygon into EO Browser.

Every "pointed corner" of the NE side of polygon presents location with a certain depth. From N to S, depths are in ascending order as drawn in Google Earth Pro (1, 2, 3, 6, 9, 12, 14, 16 and 18 meters).

To extract *pSDB* multiplied values (*pSDB * mp*) from latter depth locations, **Mark point of interest** is used. Left click on the button, zoom to the most N point with depth 1 meters and click on the "pointed corner". Then under mark point of interest click on **Statistical Info / Feature Info Service chart** button. Wait a few moments as generation could take some time. Graph with the latest values of red, green and blue channels appears (C0, C1, C2). Hover over the last green point on the right. Value 1199.92 is output. Write down that value with known depth.

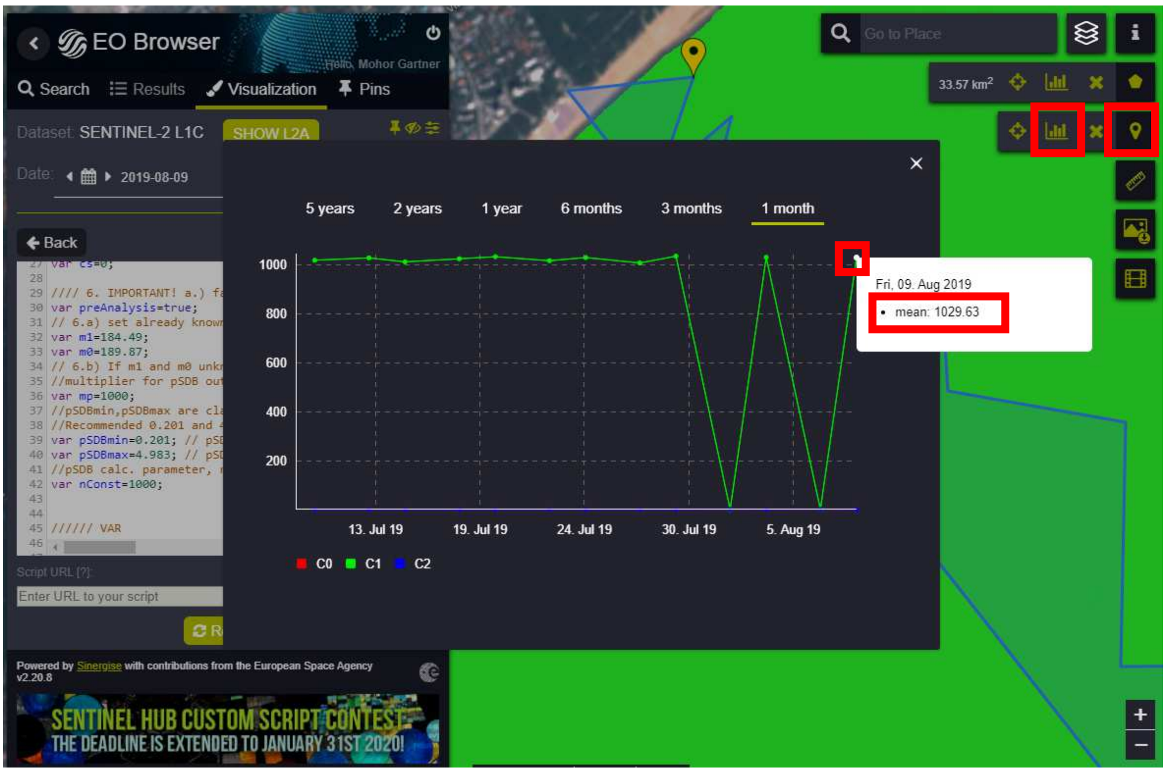


Figure 6: Extraction of multiplied pSDB values.

Repeat the procedure for other depth locations. Mark point of interest can be grabbed and moved around with holding left mouse button.

With procedure above, following table is written down.

*Table 1: Extracted multiplied pSDB values (pSDB*mp) and depths*

pSDB * mp	Depth (meters)
1029.63	1
1034.73	2
1062.22	3
1069.79	6
1081.58	9
1097.55	12
1099.53	14
1188.85	16
1122.54	18

Multipler variable mp in the script is 1000. Therefore we must divide the obtained values with 1000 to get calculated pSDB values. That produces following table.

Table 2: True pSDB values and depths

pSDB	Depth (meters)
1.02963	1
1.03473	2
1.06222	3
1.06979	6
1.08158	9
1.09755	12
1.09953	14
1.18885	16
1.12254	18

As variable *SDBgreen=true* in the script, *pSDB* values in table above relate to ratio of bands blue/green.

4. m1 and m0 evaluation with linear regression

Above values are used to obtain *m1* and *m0* values with linear regression from equation:

*depth = m1 * pSDB – m0*

This can be done in various tools. Here it is done in online tool Desmos. For above extracted pSDB and depth values, example is already done here:

https://www.desmos.com/calculator/uik2vif8lb

In the left pane, scroll down to obtain m1 and m0 values.

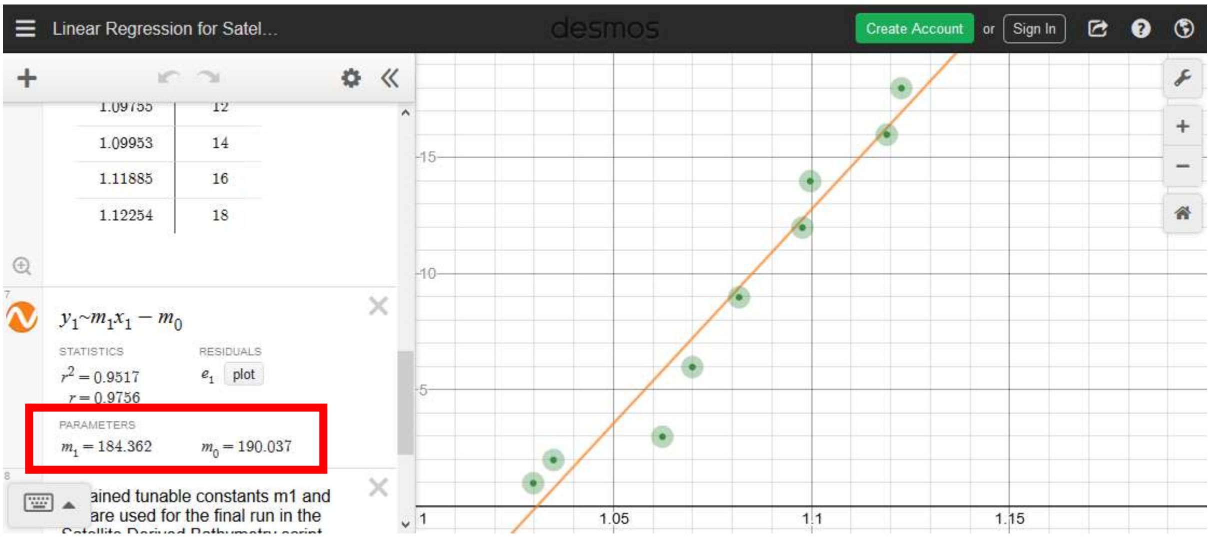


Figure 7: Example linear regression in Desmos.

5. Final scene rendering with changed input settings

m1=184.362, *m0=190.037*. Latter values must be input into the OE Browser script. In addition, *preAnalysis* variable must be changed to false.

```
//// 6. IMPORTANT! a.) false - if m1 and m0 already known OR b.)
true - pre-analysis to evaluate m1 and m0
var preAnalysis=false;
// 6.a) set already known (from articles or calculated) m1 (scale)
and m0 (offset)
var m1=184.362;
var m0=190.037;
```

With click to Refresh button 

, final scene for Satellite Derived Bathymetry is obtained.

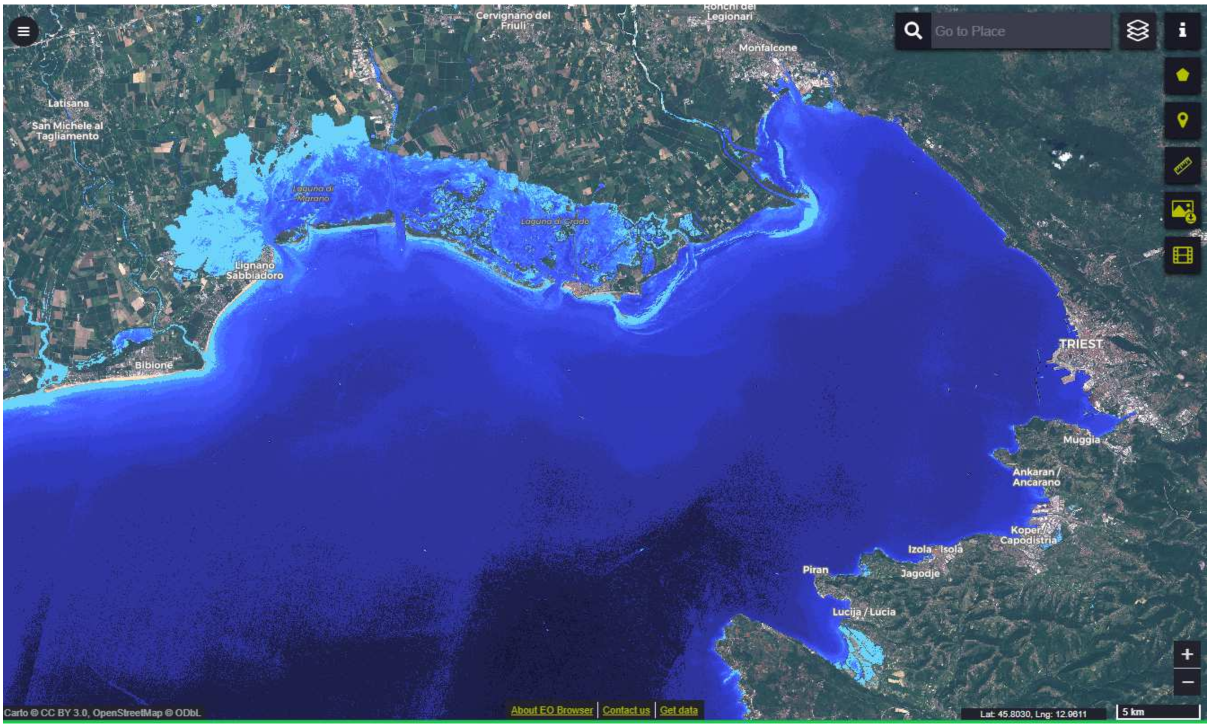


Figure 8: Final scene rendering result.

You can find link to the scene in EO Browser under references.

NOTES ON ALTERNATIVE EXTRACTION OF pSDB VALUES

Pre-analysis output can be imported to GIS software via EO Browser "Download Image with georeference" or by OGC web services (WMS, WMTS, WCS). Thus, clamped *pSDB* values in red channel (C0) can be obtained. Combined with bathymetry model, numerous depth locations with *pSDB* values could be evaluated automatically in GIS software. Therefore, linear regression could be done on more than 10 points with depth and pSDB value.

For latter described case, user should be aware of the following:

1. pSDB values in downloaded image or through OGC web services are clamped to values from minimum 0 to maximum 1. Next, it depends on the image type what is minimum and maximum possible value for specific channel (more about clamped values on Sentinel Hub https://bit.ly/2Gp7E2y).

2. Clamped values of *pSDB* in the script are affected by input settings values *pSDBmin* and *pSDBmax* in the script.

```
//pSDBmin,pSDBmax are clamped output range [0-1] of Sentinel Hub in
READ CHANNEL
//Recommended 0.201 and 4.983 - theoretical minimum and maximum
values of pSDB. If higher accuracy is needed, values 0.565 and 1.769
might be appropriate too. For latter, color values range of pSDB is
bigger
var pSDBmin=0.201; // pSDB<=pSDBmin -> Sentinel Hub returns 0 for
red channel
```

```
var pSDBmax=4.983; // pSDB>=pSDBmax -> Sentinel Hub returns 1 for
red channel
```

3. On the basis of pSDBmin, pSDBmax and clamped pSDB value (depends on the output type of the Sentinel Hub), true pSDB value can be calculated. For example, if the Sentinel Hub returns clamped values in 8-bit output, possible minimum to maximum value is 0 to 255. Therefore equation to calculate true pSDB would be:

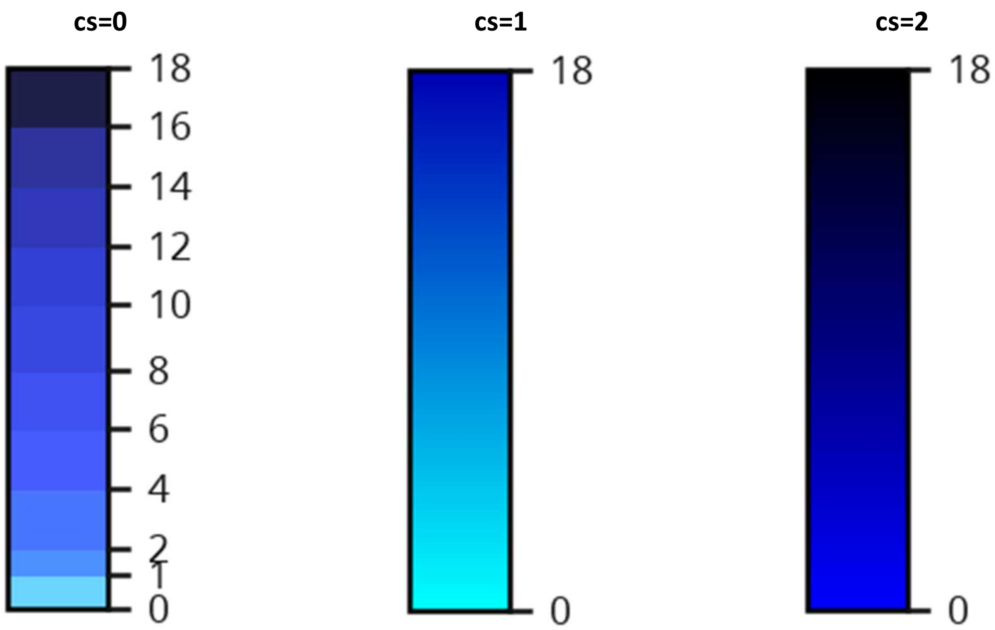
$$pSDB_{true} = \left(\frac{pSDB_{clamped}}{255}\right) \cdot (pSDB_{max} - pSDB_{min}) + pSDB_{min}$$

GIS software can output a table with clamped pSDB values and depths. Next, calculation to true *pSDB* values follows. Finally, in any appropriate tool, *m1* and *m0* can be evaluated with linear regression on pSDB and depth for any number of locations.

Example on calculation of true pSDB from clamped pSDB values can be found here: https://www.desmos.com/calculator/k8ankigztl.

DEFAULT COLOR SCHEMES AND LEGENDS

Script includes 3 default color schemes, which can be selected with definition of variable *cs*: *0*, *1* or *2*. Below are possible legends of color schemes.



REFERENCES

Trobec, A., Busetti, M., Zgur, F., Baradello, L., Babich, A., Cova, A., Gordini, E., Romeo, R., Tomini, I., Poglajen, S., Diviacco, P., Vrabec, M. 2018. Thickness of marine Holocene sediment in the Gulf of Trieste (northern Adriatic Sea). University of Ljubljana, OGS – Instituto di Ocenografia e di Geofisica Sperimantale, Universita di Trieste, Harpha Sea d.o.o. Earth System Science Data, DOI: https://doi.org/10.5194/essd-10-1077-2018.

Trobec, A. and Busetti, M. (2017): Models of the bathymetry, of the base and of the thickness of Holocene marine sediment in the Gulf of Trieste (Northern Adriatic Sea). OGS SNAP System, DOI: https://doi.org/10.6092/6ad9b1e6-c977-cec9-8a2d-db10c7f90adc.

Google, Inc. Google Earth Pro. https://www.google.com/earth/versions/

Desmos, Inc. Desmos. https://www.desmos.com/

OE Browser Scene for Satellite Derived Bathymetry Mapping Script – pre-analysis. Copy and paste the link below to your browser.

https://apps.sentinel-hub.com/eo-browser/?lat=45.6316&lng=13.3202&zoom=11&time=2019-08-09&preset=CUSTOM&datasource=Sentinel-
2%20L1C&layers=B01,B02,B03&evalscript=LyoKU0FURUxMSVRFIERFUklWRUQgQkFUSFlNRVRSWSBNQVBQSU5HCkF1dGhvcjogTW9ob3IgR2FydG5lciAoaHR
0cHM6Ly93d3cubGlua2VkaW4uY29tL2luL21vaG9yLWdhcnRuZXIvKQoqLwoKLy8vLy8vIElOUFVUIFNFVFRJTkdTCi8vLy8gMS4gU2VsZWN0IE1VTFRJLVRFTVBP
UkFMIFNDRU5FUyAoUGxheWdyb3VuZCkKdmFyIHNjZW5lcyA9IFsiMjAxOS0wOC0wOSJdOwoKLy8vLyAyLiBTZXQgd2F0ZXIgc3VyZmFjZSBkZXRlY3Rpb24gVEhSR
VNIT0xEUwovL0NhbGlicmF0aW9uIG1pZ2h0IGJlIG5lZWRlZCwgZGVwZW5kcyBvbiB0aGUgc2NlbmUKdmFyIE1ORFdJX3Rocj0wLjQyOwp2YXIgTkRXSV90aHI9MC
40OwovLy8vIDMuIFR1cm4gb24vb2ZmIGZpbHRlcmluZyBvZiBmYWxzZSB3YXRlciBzdXJmYWNlIGRldGVjdGlvbnMKLy91cmJhbiBhcmVhcyZiYXJlIHNvaWwuIFJ
lY29tbWVuZGVkPXRydWUKdmFyIGZpbHRlcl9VQUJTPXRydWU7Ci8vc2hhZG93cyZzbm93L2ljZS4gUmVjb21tZW5kZWQ9ZmFsc2UKdmFyIGZpbHRlcl9TU0k9ZmFs
c2U7CgovLy8vIDQuIFNldCBiYW5kcyBSQVRJT1MgdG8gY2FsY3VsYXRlIFNEQgovL1NEQiBjYW4gYmUgYmx1ZS9ncmVlbiAodHJ1ZSkgb3IgYmx1ZS9yZWQgKGZhb
HNlLGFrYSBTREJyZWQpCi8vR2VuZXJhbGx5IFNEQnJlZCBpcyBiZXR0ZXIgZm9yIGRlcHRoPDVtIGFuZCBTREJncmVlbiBpcyBiZXR0ZXIgZm9yIGRlcHRoPjVtCn
ZhciBTREJncmVlbj10cnVlOwoKLy8vLyA1LiBTZWxlY3QgdmlzdWFsaXphdGlvbiBzY2hlbWUgU0RCCi8vMC1ibHVlIHJhbXAsMS1ibHVlIGJsZW5kLDItYmx1ZUJ
sYWNrIGJsZW5kCnZhciBjcz0wOwoKLy8vLyA2LiBJTVBPUlRBTlQhIGEuKSBmYWxzZSAtIGlmIG0xIGFuZCBtMCBhbHJlYWR5IGtub3duIE9SIGIuKSB0cnVlIC0g
cHJlLWFuYWx5c2lzIHRvIGV2YWx1YXRlIG0xIGFuZCBtMAp2YXIgcHJlQW5hbHlzaXM9dHJ1ZTsKLy8gNi5hKSBzZXQgYWxyZWFkeSBrbm93biAoZnJvbSBhcnRpY
2xlcyBvciBjYWxjdWxhdGVkKSBtMSAoc2NhbGUpIGFuZCBtMCAob2Zmc2V0KQp2YXIgbTE9MTg0LjQ5Owp2YXIgbTA9MTg5Ljg3OwovLyA2LmIpIElmIG0xIGFuZC
BtMCB1bmtub3duLCBwcmVBbmFseXNpcz10cnVlIChhYm92ZSkgYW5kIHByZS1hbmFseXNpcyBvZiBwU0RCIGlzIG5lY2Vzc2FyeSB0byBldmFsdWF0ZSBtMSBhbmQ
gbTAhIFRoaXMgc3RlcCBpcyBkb25lICJvZmYgdGhlIHBsYXRmb3JtIiAoRVhBTVBMRSBUVVRPUklBTCBJTiBTVVBQTEVNRU5UQVJZIE1BVEVSSUFMKS4gSW4gdGhp
cyBjYXNlIG1wLCBwU0RCbWluLCBwU0RCbWF4LCBuQ29uc3QgYXJlIGFwcGxpY2FibGUKLy9tdWx0aXBsaWVyIGZvciBwU0RCIG91dHB1dCB2YWx1ZSBpbiBHUkVFT
iBDSEFOTkVMLCByZWNvbW1lbmRlZCAxMDAwCnZhciBtcD0xMDAwOyAKLy9wU0RCbWluLHBTREJtYXggYXJlIGNsYW1wZWQgb3V0cHV0IHJhbmdlIFswLTFdIG9mIF
NlbnRpbmVsIEh1YiBpbiBSRUFEIENIQU5ORUwKLy9SZWNvbW1lbmRlZCAwLjIwMSBhbmQgNC45ODMgLSB0aGVvcmV0aWNhbCBtaW5pbXVtIGFuZCBtYXhpbXVtIHZ
hbHVlcyBvZiBwU0RCLiBJZiBoaWdoZXIgYWNjdXJhY3kgaXMgbmVlZGVkLCB2YWx1ZXMgMC41NjUgYW5kIDEuNzY5IG1pZ2h0IGJlIGFwcHJvcHJpYXRlIHRvby4g
Rm9yIGxhdHRlciwgY29sb3IgdmFsdWVzIHJhbmdlIG9mIHBTREIgaXMgYmlnZ2VyCnZhciBwU0RCbWluPTAuMjAxOyAvLyBwU0RCPD1wU0RCbWluIC0%2BIFNlbnR
pbmVsIEh1YiByZXR1cm5zIDAgZm9yIHJlZCBjaGFubmVsCnZhciBwU0RCbWF4PTQuOTgzOyAvLyBwU0RCPj1wU0RCbWF4IC0%2BIFNlbnRpbmVsIEh1YiByZXR1cm
5zIDEgZm9yIHJlZCBjaGFubmVsCi8vcFNEQiBjYWxjLiBwYXJhbWV0ZXIsIHJlY29tbWVuZGVkIDEwMDAuIEFzc3VyZXMgdGhhdCBib3RoIGxvZ2FyaXRobXMgd2l
sbCBiZSBwb3NpdGl2ZSBhbmQgdGhhdCB0aGUgcmF0aW8gcHJvZHVjZXMgYSBsaW5lYXIgcmVzcG9uc2Ugb3ZlciB0aGUgcmV0cmlldmFibGUgd2F0ZXIgZGVwdGggK
dmFyIG5Db25zdD0xMDAwOwoKCi8vLy8vLyBWQVIKdmFyIG5yRFMsczFEUyxzMkRTOwovLyBDb2xvciBTREIKdmFyIGNzMD1uZXcgQ29sb3JNYXBWaXN1YWxpemVyK
FtbMSwweDZjZDNmYl0sWzIsMHg0ZDkxZmZdLFs0LDB4NDk3NmZmXSxbNiwweDQ0NWJmZl0sWzgsMHgzZTUyZjBdLCBbMTAsMHgzOTQ4ZTFdLFsxMiwweDMzM2ZkM1
0sWzE0LDB4MzAzOWI3XSxbMTYsMHgyZTM0OWJdLFsxOCwweDFlMWU0YV0sWzIwLDB4MTExMTJiXV0pOwoKLy93YXRlciBib2R5IGlkCmZ1bmN0aW9uIHdiaShyLGc
sYixucixzMSxzMikgewoJLy93YXRlciBzdXJmLgoJbGV0IHdzPTA7Cgl0cnkgewoJCXZhciBuZHZpPShuci1yKS8obnIrciksbW5kd2k9KGctczEpLyhnK3MxKSxu
ZHdpPShnLW5yKS8oZytuciksbmR3aV9sPShuci1zMSkvKG5yK3MxKSxhd2Vpc2g9YisyLjUqZy0xLjUqKG5yK3MxKS0wLjI1KnMyLGF3Zluc2g9NCooZy1zMSktK
DAuMjUqbnIrMi43NSpzMSksZGJzaT0oKHMxLWcpLyhzMStnKSktbmR2aTsKCQkvL0RFRklORSBXQgoJCWlmIChtbmR3aT5NTkRXSV90aHJ8fG5kd2k%2BTkRXSV90
aHJ8fGF3Zluc2g%2BMC4xODc5fHxhd2Vpc2g%2BMC4xMTEyfHxuZHZpPC0wLjJ8fG5kd2lfbD4xKXt3cz0xO30KCQkvL2ZpbHRlciB1cmJhbiZiYXJlCgkJd3M9K
ChmaWx0ZXJfVUFCUyYmd3M9PTEpJiYoKGF3Zluc2g8PS0wLjAzKXx8KGRic2k%2BMCkpKT8wOndzOwoJCS8vZmlsdGVyIHNoYWRvd3Mmc25vdy9pY2UKCQl3cz0o
KGZpbHRlcl9TU0kgJiYgd3M9PTEpJiYoKGF3ZWlzaDw9MC4xMTEyJiZuZHZpPi0wLjIpfHwoYXdlaW5zaDwwLjUmJm5kdmk%2BLTAuMil8fCgoYXdlaW5zaDwwfHx
hd2Vpc2g8PTB8fG5kdmk%2BLTAuMSkpfHwoKChnPj0wLjMxOSk%2FKChtbmR3aT4wLjIpPygobnI%2BMC4xNSk%2FKChiPjAuMTgpPzE6MCk6MCk6MCk6MCkpfHwo
Zz4wLjMxOSl8fChtbmR3aTxhd2VpbnNoKXx8KG5kd2ktYXdlaW5zaD4wLjUpKSk%2FMDp3czsKCX1jYXRjaChlcnIpe3dzPTA7fQoJcmV0dXJuIHdzOwp9Ci8vcFN
EQiBjYWxjLCBkZW51bTpncmVlbiBvciByZWQKZ2V0UHNkYj0oYixkZW51bSxuKT0%2BKE1hdGgubG9nKG4qYikpLyhNYXRoLmxvZyhuKmRlbnVtKSk7Ci8vU0RCCIG
NhbGMKZ2V0U2RiPShwU0RCLG0xLG0wKT0%2BbTEqcFNEQi1tMDsKLy9tdWx0aS10ZW1wLiBodHRwczovL2JpdC5seS8yVFFKV25VCmZ1bmN0aW9uIGZpbHRlclNjZ
W5lcyhzcyxpbnB1dE1ldGFkYXRhKSB7CglyZXR1cm4gc3MuZmlsdGVyKGZ1bmN0aW9uKHMpewoJCXZhciBzU3RyPWRhdGVmKHMuZGF0ZSk7CgkJcmV0dXJuKHNjZW
5lcy5pbmRleE9mKHNTdHIpPj0wKT90cnVlOmZhbHNlOwoJfSk7Cn0KZnVuY3Rpb24gZGF0ZWYodCl7Cgl2YXIgZD10LmdldERhdGUoKSxtPXQuZ2V0TW9udGgoKSs
xLHk9dC5nZXRGdWxsWWVhcigpOwoJaWYoZDwxMClkPScwJytkOwoJaWYobTwxMCltPScwJyttOwoJcmV0dXJuIHkrJy0nK20rJy0nK2Q7Cn0KLy8gc2V0dXAgdmFs
dWVzCmZ1bmN0aW9uIHNldHVwKGkpewoJdHJ5IHsKCQlzZXRJbnB1dENvbXBvbmVudHMoW2kuQjEyXSk7CgkJLy9pZiBCMTIgaXMsIFMyCgkJbnJEUz0iQjA4IjtzM
URTPSJCMTEiO3MyRFM9IkIxMiI7Cgl9Y2F0Y2goZXJyKXsKCQkvL2lmIG5vIEIxMiwgaXQgaXMgTDgKCQluckRTPSJCMDUiO3MxRFM9IkIwNiI7czJEUz0iQjA3Ij
sKCX0KCXNldElucHV0Q29tcG9uZW50cyhbaS5CMDIsaS5CMDMsaS5CMDQsaVtuckRTXSxpW3MxRFNdLGlbczJEU11dKTsKCXNldE91dHB1dENvbXBvbmVudENvdW5
0KDMpOwp9CgovL2V2YWwKZnVuY3Rpb24gZXZhbHVhdGVQaXhlbChwKSB7CgkvLy8vTixhdmcsc3VtK3JlZHVjZSBhdmcKCXZhciBOOPXAubGVuZ3RoLHdBdmc9MCxi
QXZnPTAsZ0F2Zz0wLHJBdmc9MCxwc2RiQXZnPTAsc2RiQXZnPTAsdz0wLHBzZGI9MCxzZGI9MCx0cmltTmF2Zz0wOwoJLy9sb29wIHNjZW5lcwoJZm9yICh2YXIga
T0wO2k8TjtpKyspewoJCWxldCBiaT1wW2ldLkIwMixnaT1wW2ldLkIwMyxyaT1wW2ldLkIwNDsKCQlpZigoYmkrZ2krcmk9PTMpfHwoYmkrZ2krcmk9PTApKSB7Cg
kJCSsrdHJpbU5hdmc7CgkJfWVsc2V7CgkJCS8vbmlyLHN3aXIxMgoJCQlsZXQgbnJpPXBbaV1bbnJEU10sczFfaT1wW2ldW3MxRFNdLHMyX2k9cFtpXVtzMkRTXTs
KCQkJLy9kZW51bWKCQkJbGV0IGRlTnVtaT0oU0RCZ3JlZW4pP2dpOnJpOwoJCQkvL3dhdGVyIGJvZHkgaWQKCQkJdz13YmkocmksZ2ksYmksbnJpLHMxX2ksczJf
aSk7CgkJCS8vc3VtIHBhcnQgb2YgYXZnIGNhbGMKCQkJd0F2Zz13QXZnK3c7YkF2Zz1iQXZnK2JpO2dBdmc9Z0F2ZytnaTtyQXZnPXJBdmcrcmk7CgkJCS8vY2FsY
yBwU0RCCgkJCXBzZGI9Z2V0UHNkYihiaSxkZU51bWksbkNvbnN0KTsKCQkJLy9pZiBwcmVBbmFseXNpcz1mYWxzZSwgY2FsYyBmaW5hbCBTREIKCQkJaWYgKCFwcm
VBbmFseXNpcykge3NkYj1nZXRTZGIocHNkYixtMSxtMCk7fQoJCQl3QXZnPXdBdmcrdzt0wc2RiQXZnPXBzZGJBdmcrcHNkYjtzZGJBdmc9c2RiQXZnK3NkYjtiQXZ
nPWJBdmcrYmk7Z0F2Zz1nQXZnK2dpO3JBdmc9ckF2ZytyaTsKCQl9IAoJfQoJTj1OLXRyaW1OYXZnOwoJd0F2Zz13QXZnL047YkF2Zz1iQXZnL047Z0F2Zz1nQXZn
L047ckF2Zz1yQXZnL047cHNkYkF2Zz1wc2RiQXZnL047c2RiQXZnPXNkYkF2Zy9OOwoJLy9wcmVBbmFseXNpcyBvdXQgY29sb3I6cmVkLWNsYW1wZWRNaW5NYXg7I
GdyZWVuLXRydWUgVmFsdWUqbXVsdGlwbGllcihtcCkKCWxldCBwc2RiQ29sPWNvbG9yQmxlbmQocHNkYkF2ZyxbcFNEQm1pbixwU0RCbWF4XSxbWzAsMCwwXSxbMS
wwLDFdXSkKCXBzZGJDb2xbMV09cHNkYkF2ZyptcDsKCS8vYmF0aCBjb2xvcjogcHNkYnx8c2RiKGNzMHx8MXx8MikKCWxldCBiYXRoPShwcmVBbmFseXNpcyk%2Fc
HNkYkNvbDooKGNzPT0wKT9jczAuZ2V0Q29sb3JGcm9tVmFsdWUoc2RiQXZnKTooKGNzPT0xKT9jb2xvckJsZW5kKHNkYkF2ZyxbMCwgMThdLFtbMCwxLDFdLFswLD
AsMC43XV0pOmNvbG9yQmxlbmQoc2RiQXZnLFswLCAxOF0sW1swLDAsMV0sWzAsMCwwXV0pKSk7CQoJcmV0dXJuICh3QXZnPj0wLjEpP2JhdGhGg6W3JBdmcqMixnQXZ
nKjIsYkF2ZyoyXTsKfQ%3D%3D

OE Browser Scene for Satellite Derived Bathymetry Mapping Script – final scene. Copy and paste the link below to your browser.

https://apps.sentinel-hub.com/eo-browser/?lat=45.6407&lng=13.4061&zoom=11&time=2019-08-09&preset=CUSTOM&datasource=Sentinel-
2%20L1C&layers=B01,B02,B03&evalscript=LyoKU0FURUxMSVRFIERFUklWRUQgQkFUSFlNRVRSWSBNQVBQSU5HCkF1dGhvcjogTW9ob3IgR2FydG5lciAoaHR
0cHM6Ly93d3cubGlua2VkaW4uY29tL2luL21vaG9yLWdhcnRuZXIvKQoqLwoKLy8vLy8vIElOUFVUIFNFVFRJTkdTCi8vLy8gMS4gU2VsZWN0IE1VTFRJLVRFTVBP
UkFMIFNDRU5FUyAoUGxheWdyb3VuZCkKdmFyIHNjZW5lcyA9IFsiMjAxOS0wOC0wOSJdOwoKLy8vLyAyLiBTZXQgd2F0ZXIgc3VyZmFjZSBkZXRlY3Rpb24gVEhSR
VNIT0xEUwovL0NhbGlicmF0aW9uIG1pZ2h0IGJlIG5lZWRlZCwgZGVwZW5kcyBvbiB0aGUgc2NlbmUKdmFyIE1ORFdJX3Rocj0wLjQyOwp2YXIgTkRXSV90aHI9MC
40OwovLy8vIDMuIFR1cm4gb24vb2ZmIGZpbHRlcmluZyBvZiBmYWxzZSB3YXRlciBzdXJmYWNlIGRldGVjdGlvbnMKLy91cmJhbiBhcmVhcyZiYXJlIHNvaWwuIFJ
lY29tbWVuZGVkPXRydWUKdmFyIGZpbHRlcl9VQUJTPXRydWU7Ci8vc2hhZG93cyZzbm93L2ljZS4gUmVjb21tZW5kZWQ9ZmFsc2UKdmFyIGZpbHRlcl9TU0k9ZmFs
c2U7CgovLy8vIDQuIFNldCBiYW5kcyBSQVRJT1MgdG8gY2FsY3VsYXRlIFNEQgovL1NEQiBjYW4gYmUgYmx1ZS9ncmVlbiAodHJ1ZSkgb3IgYmx1ZS9yZWQgKGZhb
HNlLGFrYSBTREJyZWQpCi8vR2VuZXJhbGx5IFNEQnJlZCBpcyBiZXR0ZXIgZm9yIGRlcHRoPDVtIGFuZCBTREJncmVlbiBpcyBiZXR0ZXIgZm9yIGRlcHRoPjVtCn
ZhciBTREJncmVlbj10cnVlOwoKLy8vLyA1LiBTZWxlY3QgdmlzdWFsaXphdGlvbiBzY2hlbWUgU0RCCi8vMC1ibHVlIHJhbXAsMS1ibHVlIGJsZW5kLDItYmx1ZUJ
sYWNrIGJsZW5kCnZhciBjcz0wOwoKLy8vLyA2LiBJTVBPUlRBTlQhIGEuKSBmYWxzZSAtIGlmIG0xIGFuZCBtMCBhbHJlYWR5IGtub3duIE9SIGIuKSB0cnVlIC0g
cHJlLWFuYWx5c2lzIHRvIGV2YWx1YXRlIG0xIGFuZCBtMAp2YXIgcHJlQW5hbHlzaXM9ZmFsc2U7Ci8vIDYuYSkgc2V0IGFscmVhZHkga25vd24gKGZyb20gYXJ0a
WNsZXMgb3IgY2FsY3VsYXRlZCkgbTEgKHNjYWxlKSBhbmQgbTAgKG9mZnNldCkKdmFyIG0xPTE4NC4zNjI7CnZhciBtMD0xOTAuMDM3OwovLyA2LmIpIElmIG0xIG
FuZCBtMCB1bmtub3duLCBwcmVBbmFseXNpcz10cnVlIChhYm92ZSkgYW5kIHByZS1hbmFseXNpcyBvZiBwU0RCIGlzIG5lY2Vzc2FyeSB0byBldmFsdWF0ZSBtMSB
hbmQgbTAhIFRoaXMgc3RlcCBpcyBkb25lICJvZmYgdGhlIHBsYXRmb3JtIiAoRVhBTVBMRSBUVVRPUklBTCBJTiBTVVBQTEVNRU5UQVJZIE1BVEVSSUFMKS4gSW4g
dGhpcyBjYXNlIG1wLCBwU0RCbWluLCBwU0RCbWF4LCBuQ29uc3QgYXJlIGFwcGxpY2FibGUKLy9tdWx0aXBsaWVyIGZvciBwU0RCIG91dHB1dCB2YWx1ZSBpbiBHU
kVFTiBDSEFOTkVMLCByZWNvbW1lbmRlZCAxMDAwCnZhciBtcD0xMDAwOyAKLy9wU0RCbWluLHBTREJtYXggYXJlIGNsYW1wZWQgb3V0cHV0IHJhbmdlIFswLTFdIG
9mIFNlbnRpbmVsIEh1YiBpbiBSRUFEIENIQU5ORUwKLy9SZWNvbW1lbmRlZCAwLjIwMSBhbmQgNC45ODMgLSB0aGVvcmV0aWNhbCBtaW5pbXVtIGFuZCBtYXhpbXV
tIHZhbHVlcyBvZiBwU0RCLiBJZiBoaWdoZXIgYWNjdXJhY3kgaXMgbmVlZGVkLCB2YWx1ZXMgMC41NjUgYW5kIDEuNzY5IG1pZ2h0IGJlIGFwcHJvcHJpYXRlIHRv
by4gRm9yIGxhdHRlciwgY29sb3IgdmFsdWVzIHJhbmdlIG9mIHBTREIgaXMgYmlnZ2VyCnZhciBwU0RCbWluPTAuMjAxOyAvLyBwU0RCPD1wU0RCbWluIC0%2BIFN
lbnRpbmVsIEh1YiByZXR1cm5zIDAgZm9yIHJlZCBjaGFubmVsCnZhciBwU0RCbWF4PTQuOTgzOyAvLyBwU0RCPj1wU0RCbWF4IC0%2BIFNlbnRpbmVsIEh1YiByZX
R1cm5zIDEgZm9yIHJlZCBjaGFubmVsCi8vcFNEQiBjYWxjLiBwYXJhbWV0ZXIsIHJlY29tbWVuZGVkIDEwMDAuIEFzc3VyZXMgdGhhdCBib3RoIGxvZ2FyaXRobXM
gd2lsbCBiZSBwb3NpdGl2ZSBhbmQgdGhhdCB0aGUgcmF0aW8gcHJvZHVjZXMgYSBsaW5lYXIgcmVzcG9uc2Ugb3ZlciB0aGUgcmV0cmlldmFibGUgd2F0ZXIgZGVw
dGgKdmFyIG5Db25zdD0xMDAwOwoKCi8vLy8vLyBWQVIKdmFyIG5yRFMczFEUyxzMkRTOwovLyBDb2xvciBTREIKdmFyIGNzMD1uZXcgQ29sb3JNYXBWaXN1YWxpe
mVyKFtbMSwweDZjZDNmYl0sWzIsMHg0ZDkxZmZdLFs0LDB4NDk3NmZmXSxbNiwweDQ0NWJmZl0sWzgsMHgzZTUyZjBdLCBbMTAsMHgzOTQ4ZTFdLFsxMiwweDMzM2
ZkM10sWzE0LDB4MzAzOWI3XSxbMTYsMHgyZTM0OWJdLFsxOCwweDFlMWU0YV0sWzIwLDB4MTExMTJiXV0pOwoKLy93YXRlciBib2R5IGlkCmZ1bmN0aW9uIHdiaSh
yLGcsYixucixzMSxzMikgewoJLy93YXRlciBzdXJmLgoJbGV0IHdzPTA7Cgl0cnkgewoJCXZhciBuZHZpPShuci1yKS8obnIrciksbW5kd2k9KGctczEpLyhnK3Mx
KSxuZHdpPShnLW5yKS8oZytucikserbR3aV9sPShuci1zMSkvKG5yK3MxKSxhd2Vpc2g9YisyLjUqZy0xLjUqKG5yK3MxKS0wLjI1KnMyLGF3Wluc2g9NCooZy1zM
SktKDAuMjUqbnIrMi43NSpzMSksZGJzaT0oKHMxLWcpLyhzMStnKSktbmR2aTsKCQkvL0RFRklORSBXQgoJCWlmIChtbmR3aT5NTkRXSV90aHJ8fG5kd2k%2BTkRX
SV90aHJ8fGF3Wluc2g%2BMC4xODc5fHxhd2Vpc2g%2BMC4xMTEyfHxuZHZpPC0wLjJ8fG5kd2lfbD4xKXt3cz0xO30KCQkvL2ZpbHRlciB1cmJhbiZiYXJlCgkJd
3M9KChmaWx0ZXJfVUFCUyYmd3M9PTEpJiYoKGF3Wluc2g8PS0wLjAzKXx8KGRic2k%2BMCkpKT8wOndzOwoJCS8vZmlsdGVyIHNoYWRvd3Mmc25vdy9pY2UKCQl3
cz0oKGZpbHRlcl9TU0kgJiYgd3M9PTEpJiYoKGF3ZWlzaDw9MC4xMTEyJiZuZHZpPi0wLjIpfHwoYXdlaW5zaDwwLjUmJm5kdmk%2BLTAuMil8fCgoYXdlaW5zaDw
wfHxhd2Vpc2g8PTB8fG5kdmk%2BLTAuMSkpfHwoKChnPj0wLjMxOSk%2FKChtbmR3aT4wLjIpPygobnI%2BMC4xNSk%2FKChiPjAuMTgpPzE6MCk6MCk6MCk6MCkp
fHwoZz4wLjMxOSl8fChtbmR3aTxhd2VpbnNoKXx8KG5kd2ktYXdlaW5zaD4wLjUpKSk%2FMDp3czsKCX1jYXRjaChlcnIpe3dzPTA7fQoJcmV0dXJuIHdzOwp9Ci8
vcFNEQiBjYWxjLCBkZW51bTpncmVlbiBvciByZWQKZ2V0UHNkYj0oYixkZW51bSxuKT0%2BKE1hdGgubG9nKG4qYikpLyhNYXRoLmxvZyhuKmRlbnVtKSk7Ci8vU0
RCIGNhbGMKZ2V0U2RiPShwU0RCLG0xLG0wKT0%2BbTEqcFNEQi1tMDsKLy9tdWx0aS10ZW1wLiBodHRwczovL2JpdC5seS8yVFFKV25VCmZ1bmN0aW9uIGZpbHRlc
lNjZW5lcyhzcyxpbnB1dE1ldGFkYXRhKSB7CglyZXR1cm4gc3MuZmlsdGVyKGZ1bmN0aW9uKHMpewoJCXZhciBzU3RyPWRhdGVmKHMuZGF0ZSk7CgkJcmV0dXJuKH
NjZW5lcy5pbmRleE9mKHNTdHIpPj0wKT90cnVlOmZhbHNlOwoJfSk7Cn0KZnVuY3Rpb24gZGF0ZWYodCl7Cgl2YXIgZD10LmdldERhdGUoKSxtPXQuZ2V0TW9udGg
oKSsxLHk9dC5nZXRGdWxsWWVhcigpOwoJaWYoZDwxMClkPScwJytkOwoJaWYobTwxMCltPScwJyttOwoJcmV0dXJuIHkrJy0nK20rJy0nK2Q7Cn0KLy8gc2V0dXAg
dmFsdWVzCmZ1bmN0aW9uIHNldHVwKGkpewoJdHJ5IHsKCQlzZXRJbnB1dENvbXBvbmVudHMoW2kuQjEyXSk7CgkJLy9pZiBCMTIgaXMsIFMyCgkJbnJEUz0iQjA4I
jtzMURTPSJCMTEiO3MyRFM9IkIxMiI7Cgl9Y2F0Y2goZXJyKXsKCQkvL2lmIG5vIEIxMiwgaXQgaXMgTDgKCQluckRTPSJCMDUiO3MxRFM9IkIwNiI7czJEUz0iQj
A3IjsKCX0KCXNldElucHV0Q29tcG9uZW50cyhbaS5CMDIsaS5CMDMsaS5CMDQsaVtuckRTXSxpW3MxRFNdLGlbczJEU11dKTsKCXNldE91dHB1dENvbXBvbmVudEN
vdW50KDMpOwp9CgovL2V2YWwKZnVuY3Rpb24gZXZhbHVhdGVQaXhlbChwKSB7CgkvLy8vTixhdmcsc3VtK3JlZHVjZSBhdmcKCXZhciBOOPXAubGVuZ3RoLHdBdmc9
MCxiQXZnPTAsZ0F2Zz0wLHJBdmc9MCxwc2RiQXZnPTAsc2RiQXZnPTAsdz0wLHBzZGI9MCxzZGI9MCx0cmltTmF2Zz0wOwoJLy9sb29wIHNjZW5lcwoJZm9yICh2Y
XIgaT0wO2k8TjtpKyspewoJCWxldCBiaT1wW2ldLkIwMixnaT1wW2ldLkIwMyxyaT1wW2ldLkIwNDsKCQlpZigoYmkrZ2krcmk9PTMpfHwoYmkrZ2krcmk9PTApKS
B7CgkJCSsrdHJpbU5hdmc7CgkJfWVsc2V7CgkJCS8vbmlyLHN3aXIxMgoJCQlsZXQgbnJpPXBbaV1bbnJEU10sczFfaT1wW2ldW3MxRFNdLHMyX2k9cFtpXVtzMkR
TXTsKCQkJLy9kZW51bWKCQkJbGV0IGRlTnVtaT0oU0RCZ3JlZW4pP2dpOnJpOwoJCQkvL3dhdGVyIGJvZHkgaWQKCQkJdz13YmkocmksZ2ksYmksbnJpLHMxX2ks
czJfaSk7CgkJCS8vc3VtIHBhcnQgb2YgYXZnIGNhbGMKCQkJd0F2Zz13QXZnK3c7YkF2Zz1iQXZnK2JpO2dBdmc9Z0F2Zytnaj
TtyQXZnPXJBdmcrcmk7CgkJCS8vY
2FsYyBwU0RCCgkJCXBzZGI9Z2V0UHNkYihiaSxkZU51bWksbkNvbnN0KTsKCQkJLy9pZiBwcmVBbmFseXNpcz1mYWxzZSwgY2FsYyBmaW5hbCBTREIKCQkJaWYgKC
FwcmVBbmFseXNpcykge3NkYj1nZXRTZGIocHNkYixtMSxtMCk7fQoJCQl3QXZnPXdBdmcrdztwc2RiQXZnPXBzZGJBdmcrcHNkYjtzZGJBdmc9c2RiQXZnK3NkYjt
iQXZnPWJBdmcrYmk7Z0F2Zz1nQXZnK2dpO3JBdmc9ckF2ZytyaTsKCQl9IAoJfQoJTj1OLXRyaW1OYXZnOwoJd0F2Zz13QXZnL047YkF2Zz1iQXZnL047Z0F2Zz1n
QXZnL047ckF2Zz1yQXZnL047cHNkYkF2Zz1wc2RiQXZnL047c2RiQXZnPXNkYkF2Zy9OOwoJLy9wcmVBbmFseXNpcyBvdXQgY29sb3I6cmVkLWNsYW1wZWRNaW5NY
Xg7IGdyZWVuLXRydWUgVmFsdWUqbXVsdGlwbGllcihtcCkKCWxldCBwc2RiQ29sPWNvbG9yQmxlbmQocHNkYkF2ZyxbcFNEQm1pbixwU0RCbWF4XSxbWzAsMCwwXS
xbMSwwLDFdXSkKCXBzZGJDb2xbMV09cHNkYkF2ZyptcDsKCS8vYmF0aCBjb2xvcjogcHNkYnx8c2RiKGNzMHx8MXx8MikKCWxldCBiYXRoPShwcmVBbmFseXNpcyk
%2FcHNkYkNvbDooKGNzPT0wKT9jczAuZ2V0Q29sb3JGcm9tVmFsdWUoc2RiQXZnKTooKGNzPT0xKT9jb2xvckJsZW5kKHNkYkF2ZyxbMCwgMThdLFtbMCwxLDFdLF
swLDAsMC43XV0pOmNvbG9yQmxlbmQoc2RiQXZnLFswLCAxOF0sW1swLDAsMV0sWzAsMCwwXV0pKSk7CQoJcmV0dXJuICh3QXZnPj0wLjEpP2JhdGg6W3JBdmcqMix
nQXZnKjIsYkF2ZyoyXTsKfQ%3D%3D