

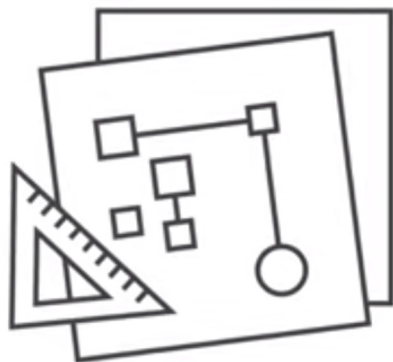
Google Earth Engine

A planetary-scale platform for Earth science data & analysis

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#OceanDataBootcamp



Letting scientists focus on science

instead of downloading & managing data

PETABYTES OF REMOTE SENSING DATASETS INCLUDING:

LANDSAT

SENTINEL

MODIS

Non-satellite img

Seus próprios dados

Exemplo

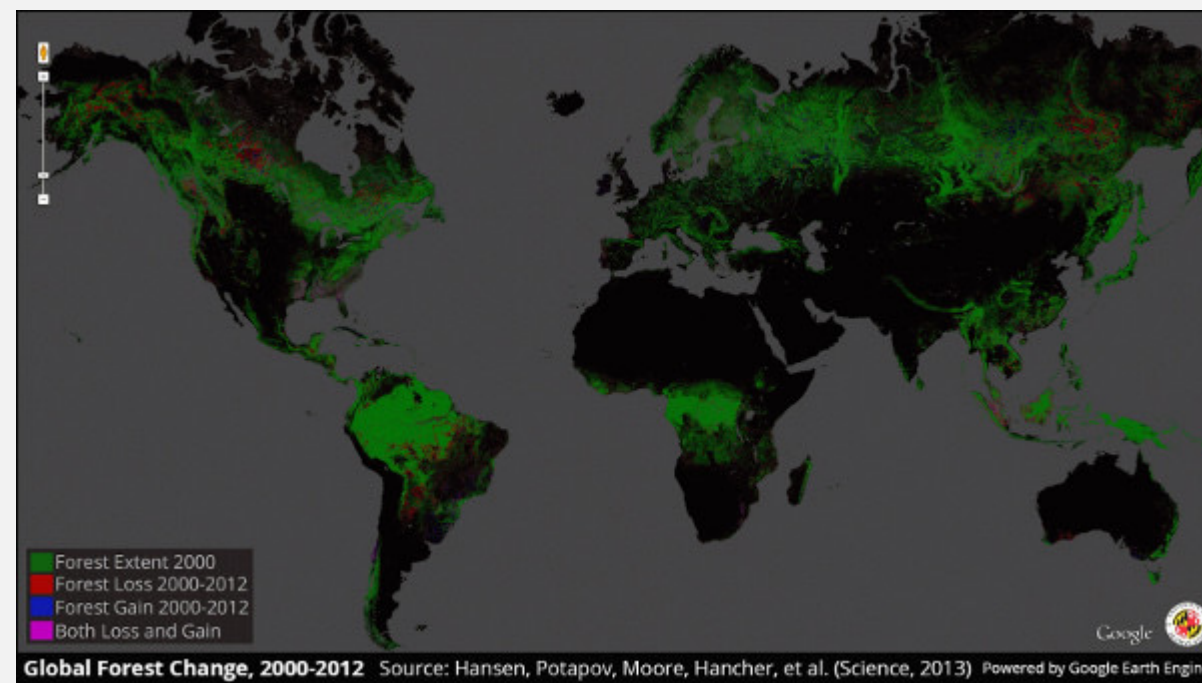
Trabalho em escala global

resolução 30m

→ 143 bi pixels

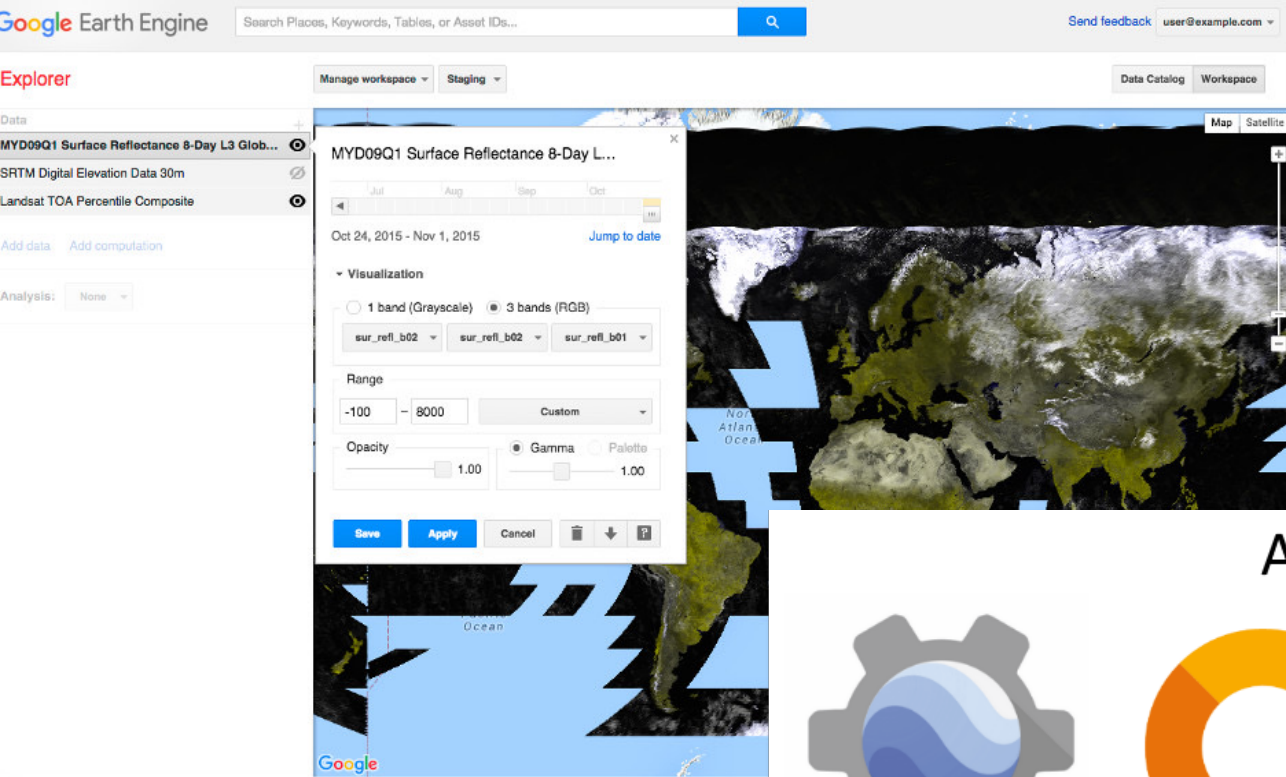
“This is the first map of forest change that is globally consistent and locally relevant. What would have taken a single computer 15 years to perform was completed in a matter of days using Google Earth Engine computing.”

- *Professor Matt Hansen, University of Maryland*

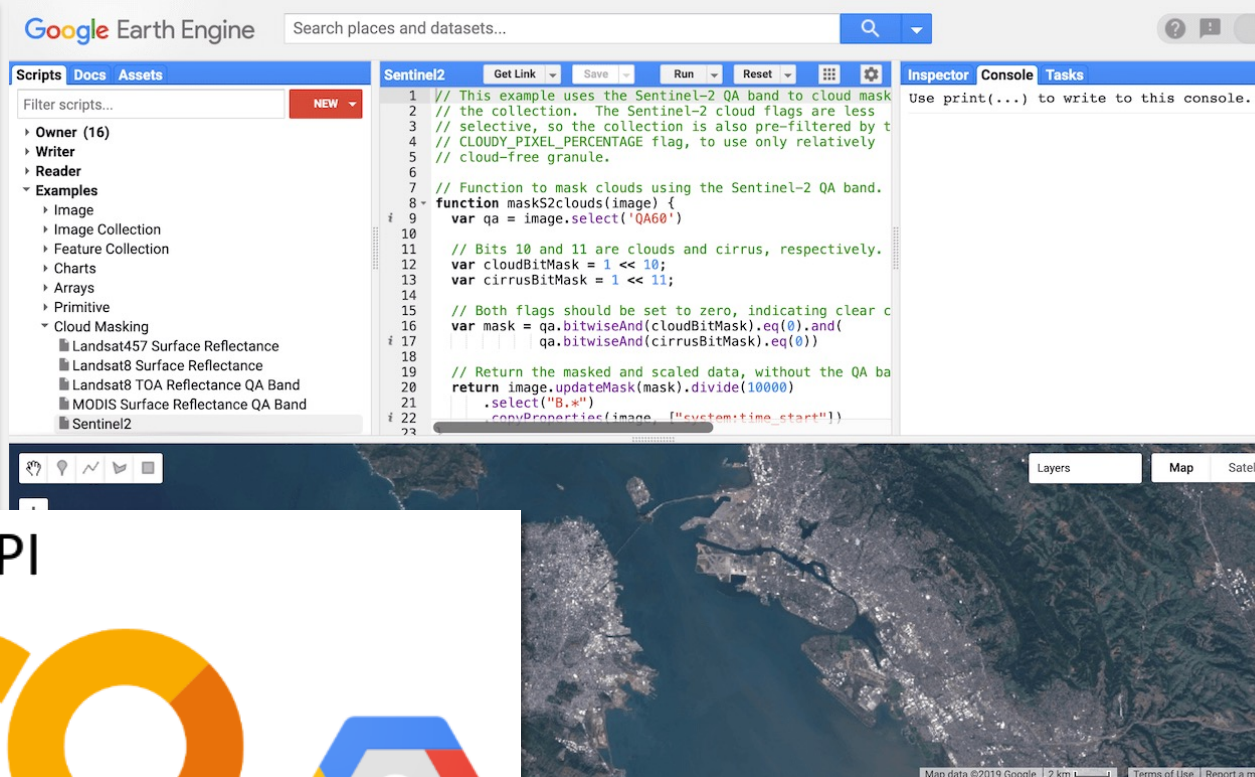




Explorer



Code Editor



API



JavaScript



Python



REST



Documentação

<https://developers.google.com/earth-engine/guides/getstarted>

Image Visualization

Compositing and Mosaicking

<https://code.earthengine.google.com/>

Examples

Image > From Name

Image > Normalized Difference

Image Collection > Filtered Composite

Charts > Elevation Profile

<https://www.mdpi.com/2072-4292/13/8/1469/htm>

PQA_1

Google Earth Engine

LANDSAT/LC08/C01/T1_RT_TOA

Scripts Docs Assets

Filter scripts... NEW ↕

Owner (1)
Writer
Reader
Archive
No accessible repositories. Click Refresh to check again.
Examples
Image
Image Collection
Feature Collection
Charts
Arrays
Primitive
Cloud Masking
Code Editor
User Interface
Datasets
Demos

PQA_1

Get Link Save Run Reset Apps

```
Imports (5 entries)
var geometry: Point (-40.19, -19.94)
var imageCollection: ImageCollection "USGS Landsat 8 Collection 1 Tier 1 and Real-Time data..."
var PM: Polygon, 7 vertices
var PA: MultiPolygon, 17 vertices
var Control: MultiPolygon, 22 vertices

1 //Filter imported ImageCollection (LANDSAT8) with bounds, date and total cloud cover:
2 var imgs = imageCollection.filterDate('2013-01-01','2022-07-08').filterBounds(geometry)
3   .filterMetadata('CLOUD_COVER','less_than',50);
4
5 //Defining mangrove region of interest (roi):
6 var roi = ee.FeatureCollection([
7   ee.Feature(PM,{label: 'PM'}), // geometry 1
8   ee.Feature(PA,{label: 'PA'}), // geometry 2
9   ee.Feature(Control,{label: 'control'}) // geometry 3
10  ]);
11
12 //Create map function to create property RNS_CLOUD (will be equal to 2720 if no clouds over roi):
13 var addCLOUD = function(image) {
14   //This reducer will calculate the mean value of 'BQA' band for all pixels inside roi
15   //If this mean value equals 2720, there's no cloud pixel over roi
16   var aaa = image.select('BQA').reduceRegion({
17     reducer: ee.Reducer.mean(),
18   });
19 }
```

Inspector Console Tasks

Use print(...) to write to this console.

Average NDVI Value by Date

PM PA control

NDVI

Date

Layers Mapa Satélite

Google

Atalhos do teclado Dados cartográficos ©2022 1 km Termos de Uso Informar erro no mapa

ee.Classifier

ee.Classifier.amnhMaxent
ee.Classifier.decisionTree
ee.Classifier.decisionTreeEnsemble
ee.Classifier.libsvm
ee.Classifier.minimumDistance
ee.Classifier.smileCart
ee.Classifier.smileGradientTreeBoost
ee.Classifier.smileNaiveBayes
ee.Classifier.smileRandomForest
ee.Classifier.spectralRegion
confusionMatrix()

```
// Overlay the points on the imagery to get training.
```

```
var training = image.select(bands).sampleRegions({  
  collection: points,  
  properties: [label],  
  scale: 30  
});
```

```
// Train a CART classifier with default parameters.
```

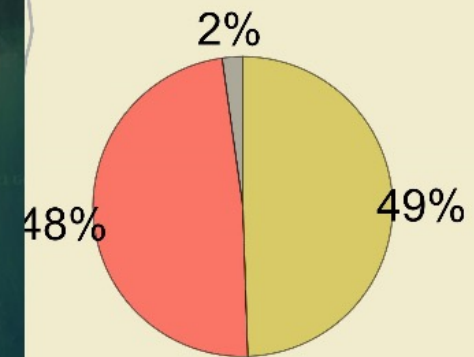
```
var trained = ee.Classifier.smileCart().train(training, label, bands);
```

```
// Classify the image with the same bands used for training.
```

```
var classified = image.select(bands).classify(trained);
```

Machine learning

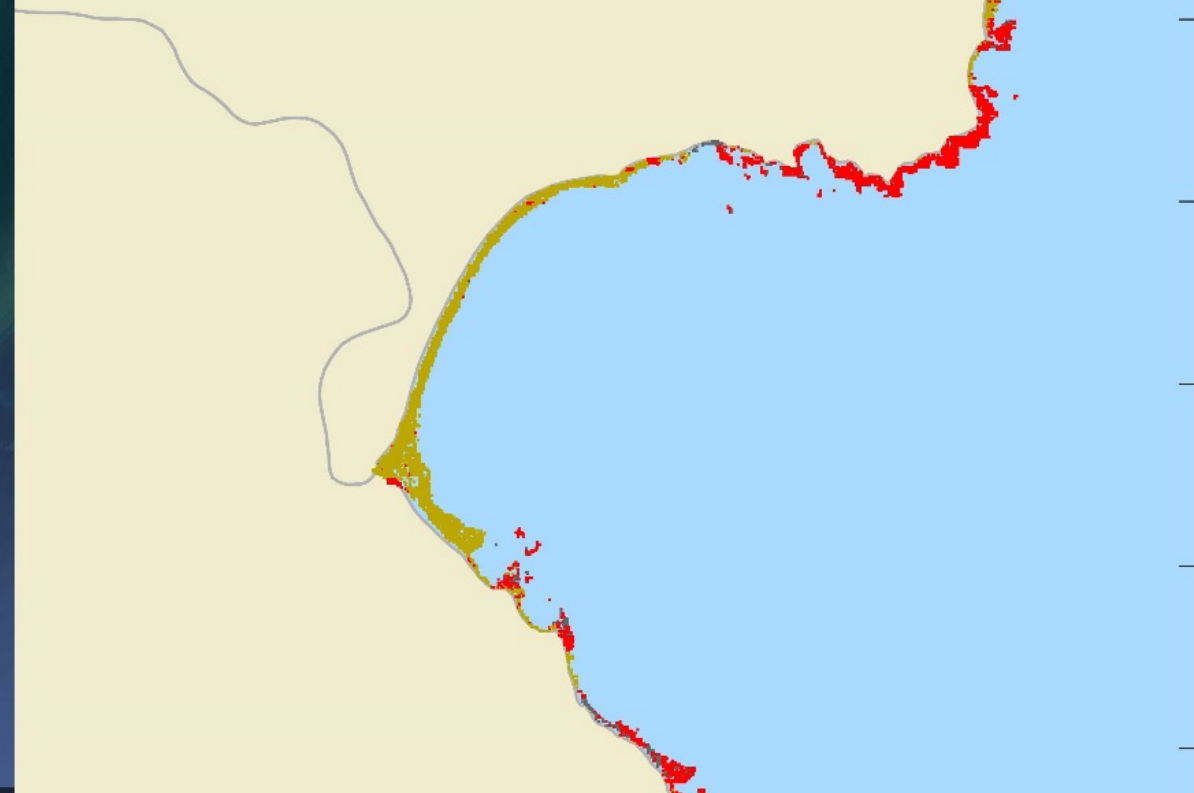
<https://code.earthengine.google.com/>



Granite: 0.89 ha

Laterite: 19.38 ha

Unconsolidated: 19.84 ha



WORKSHOP OCEAN DATA BOOTCAMP

GESTÃO DE DADOS DE
MONITORAMENTO COSTEIRO



intertidalSentinel

Get Link

Save

Run

Reset

Apps



Inspector

Console

Tasks

```
43 var coast = coastline.reduceToImage({properties: ['class'],
44   reducer: ee.Reducer.first()
45 });
46 var kernel = ee.Kernel.euclidean(500,"meters");
47 var distance = coast.distance(kernel,false);
48
49 //including elev and slope:
50 lowtide = lowtide.addBands(elevation);
51 lowtide = lowtide.addBands(slope);
52
53 //masks:
54 var intertidal = lowtide.updateMask(distance.gte(0));
55 var mask1 = lowtide.select('NDWI').lt(-0.15);
56 var mask2 = hightide.select('NDWI').gt(0.3);
57
58 intertidal = intertidal.updateMask(mask1);
59 intertidal = intertidal.updateMask(mask2);
60
61 //MACHINE LEARNING:
62 var bandas = ['B2', 'B3', 'B4','B5','B6','B7', 'B8','B8A','B9','B10','B11','B12','NDWI','elevation','slope'];
63
64 // Make a FeatureCollection from the hand-made geometries.
65 var polygons = ee.FeatureCollection([
```

Use print(...) to write to this console.

granite: grey | laterite:red | unconsolidated: yellow | other: cyan

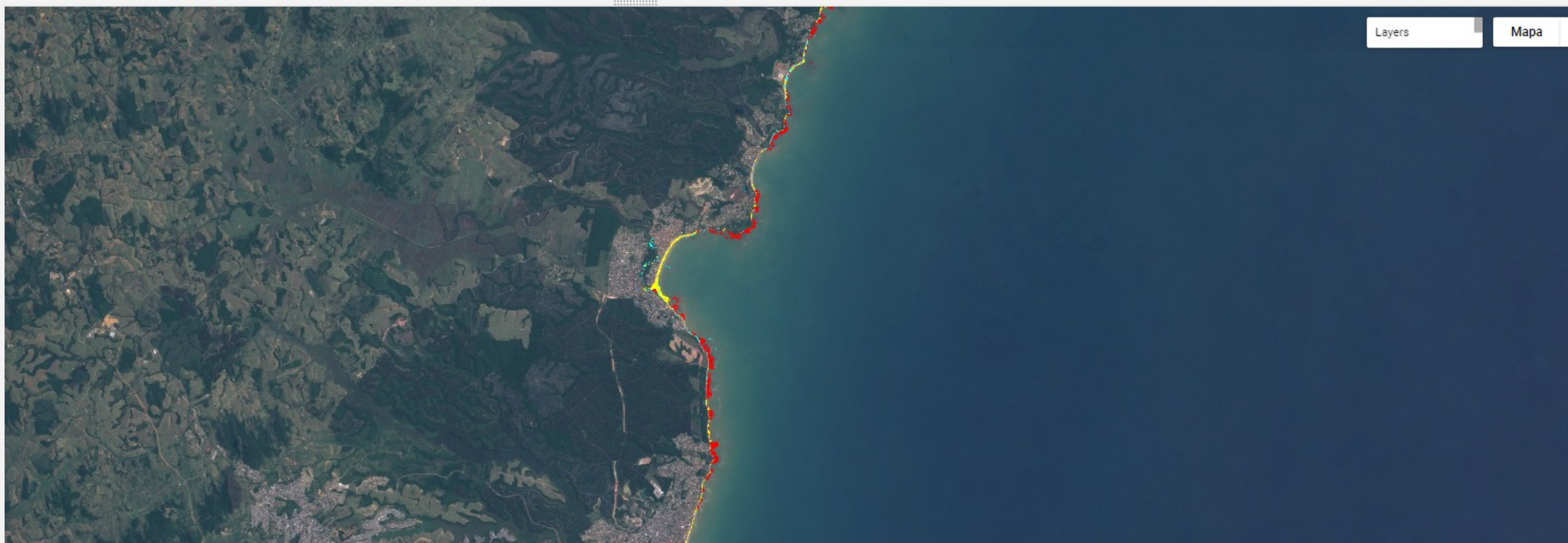
Confusion Matrix
List (5 elements)

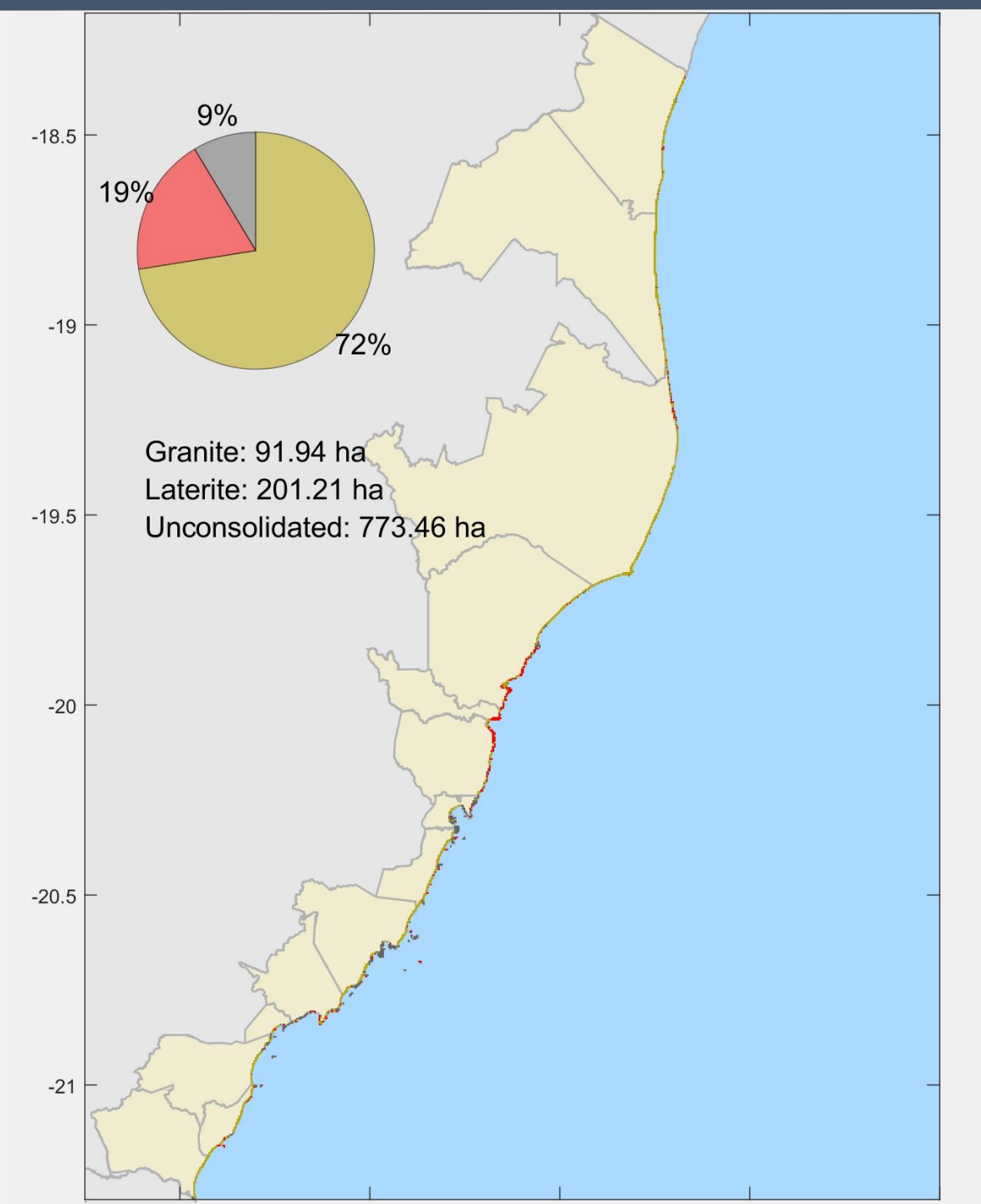
Validation overall accuracy:
0.9837245160185026

Training overall accuracy:
0.9976720417896888

Layers

Mapa







Obrigado!

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