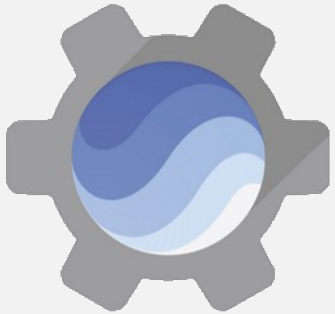
WORKSHOP
OCEAN DATA BOOTCAMP
GESTÃO DE DADOS DE MONITORAMENTO COSTEIRO



Google Earth Engine

A planetary-scale platform for Earth science data & analysis

Ricardo Servino

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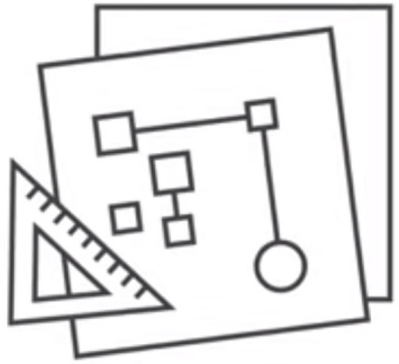
PETABYTES
OF REMOTE SENSING DATASETS INCLUDING:

- LANDSAT
- SENTINEL
- MODIS
- Non-satellite img
- Seus próprios dados



Letting scientists focus on science

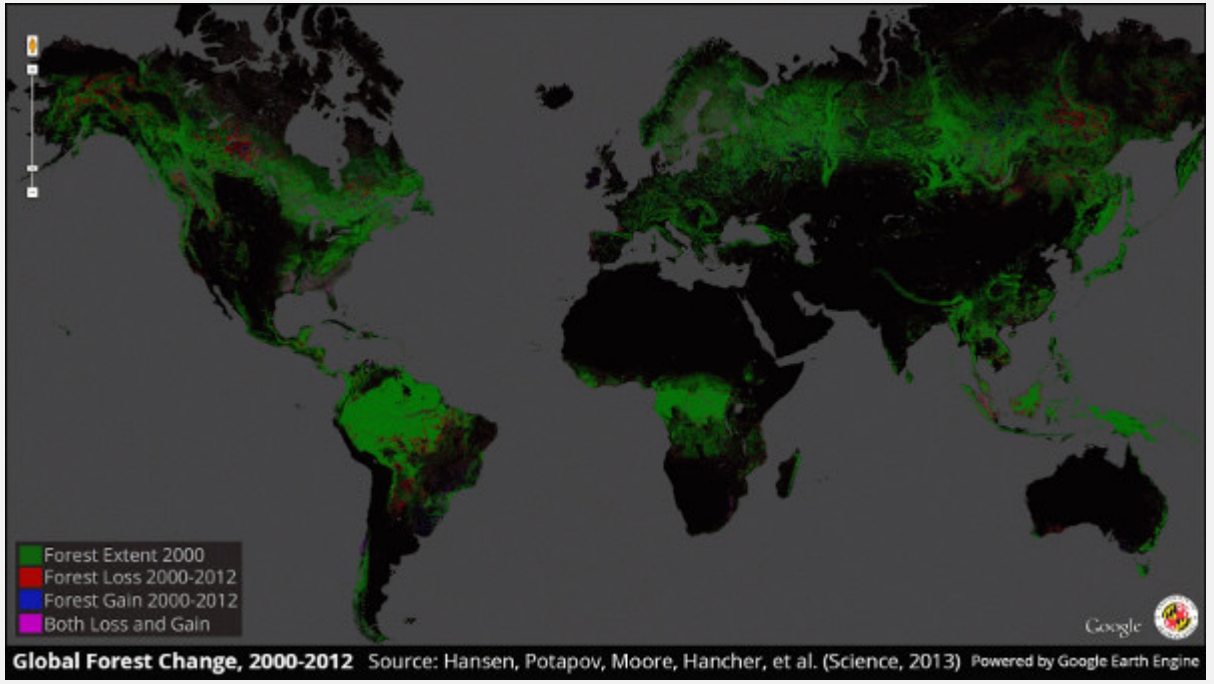
instead of downloading & managing data

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

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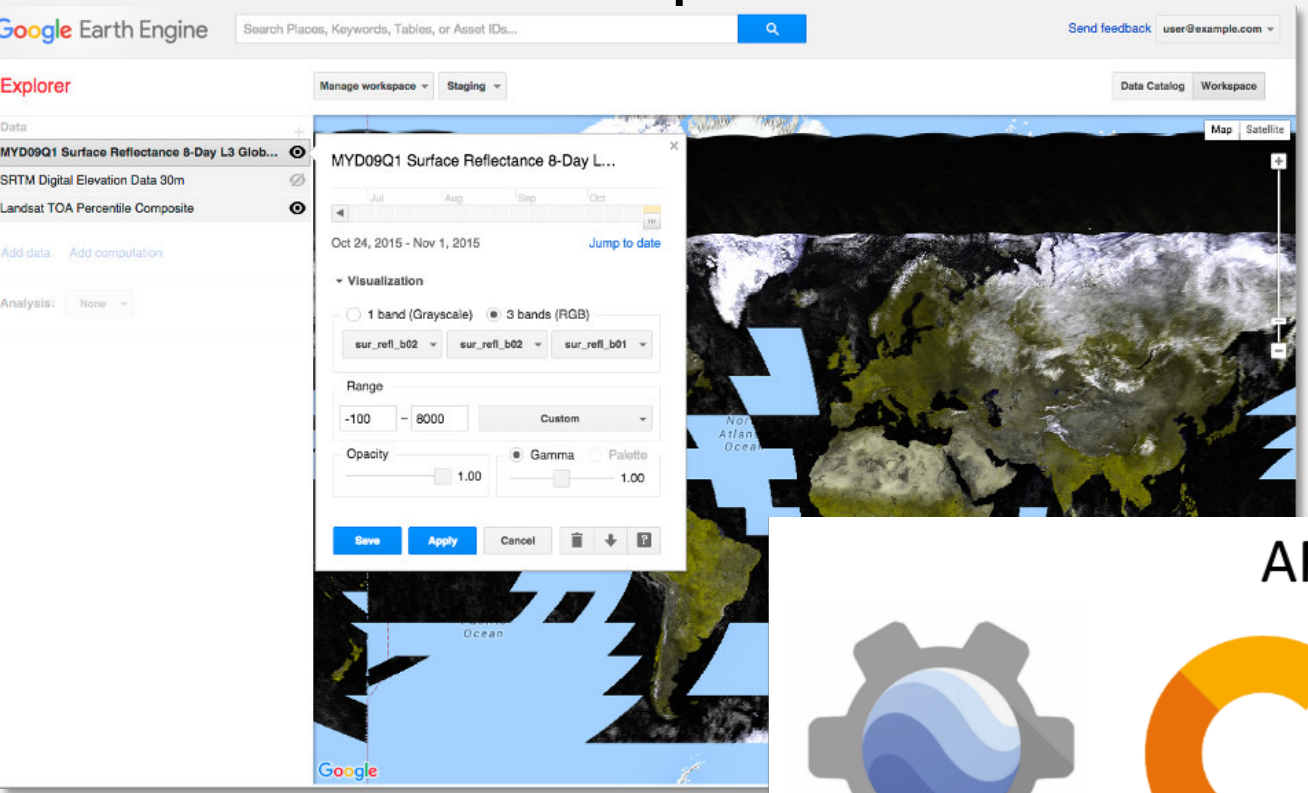
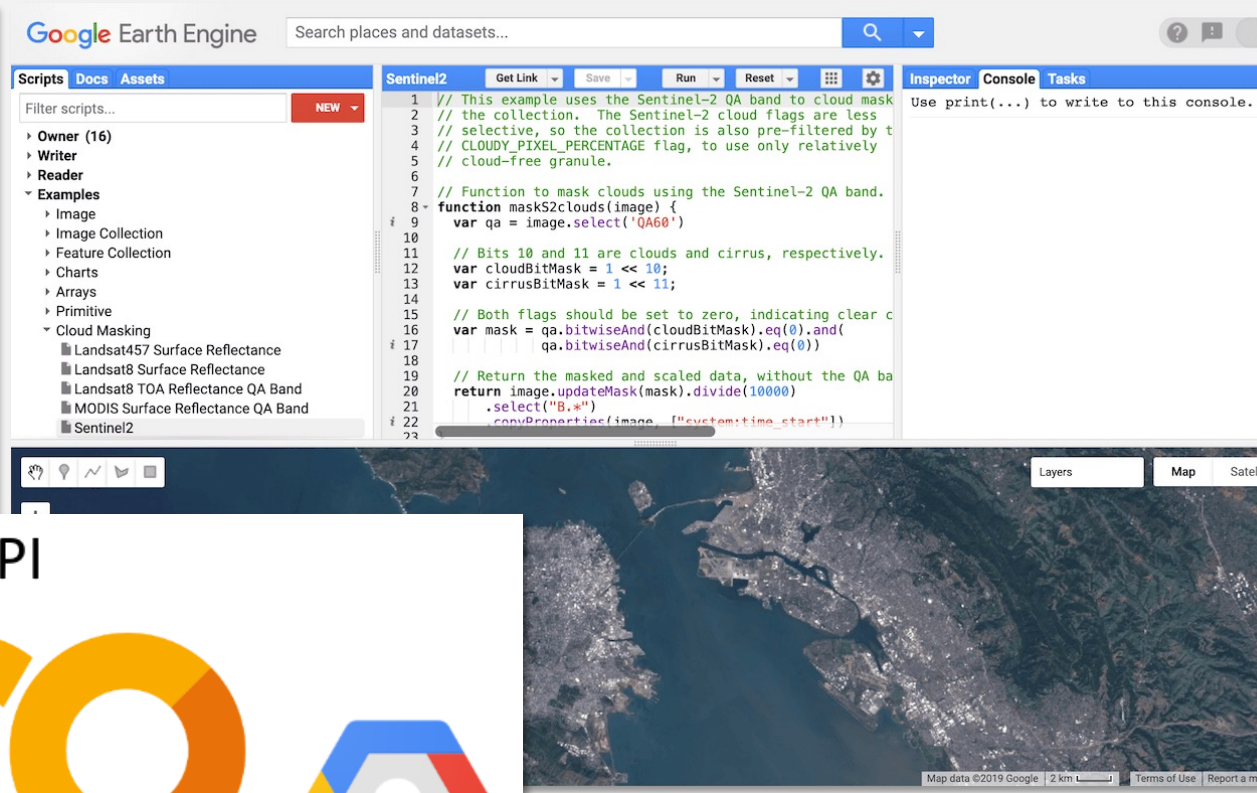
Explorer



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

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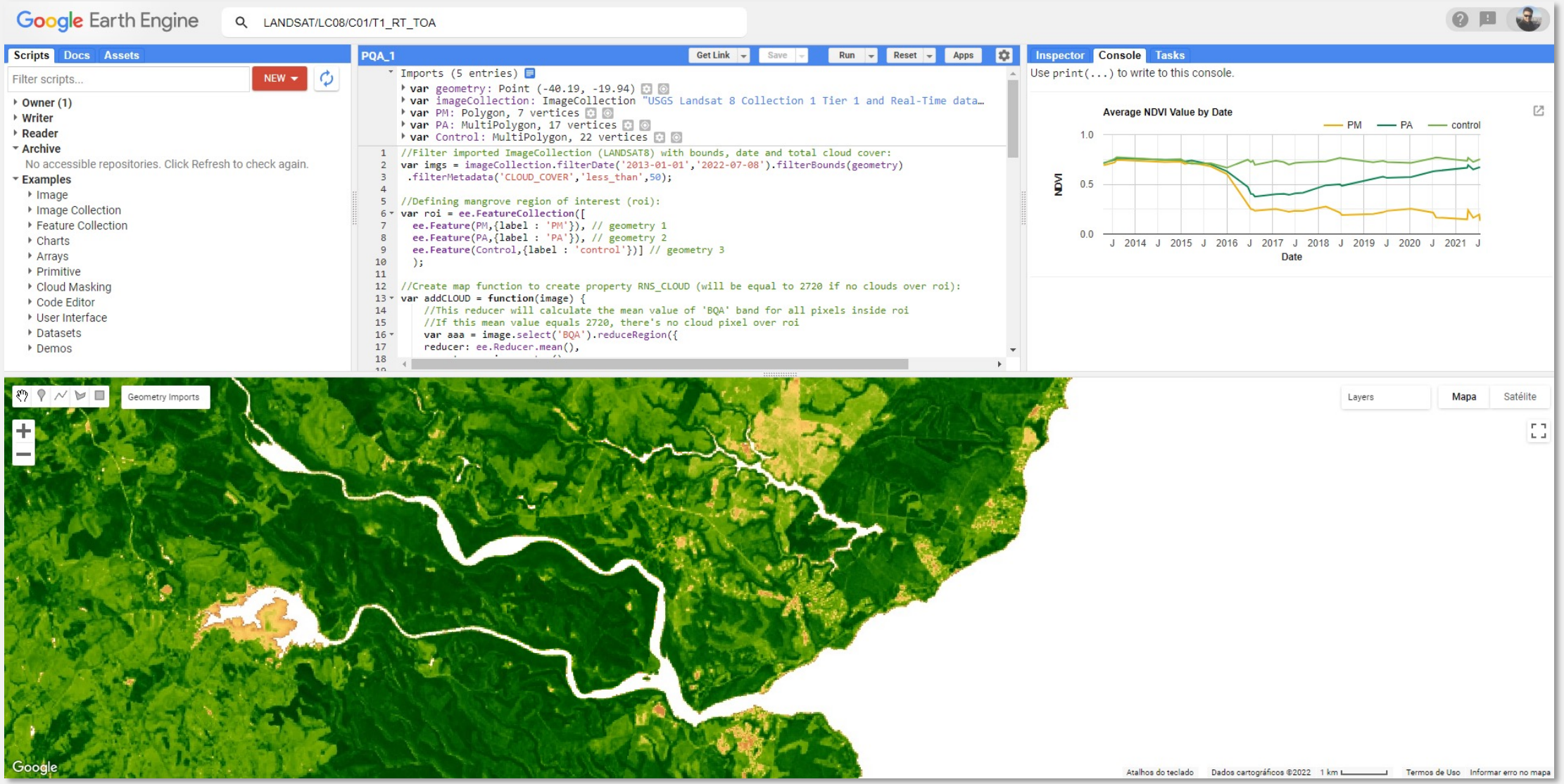
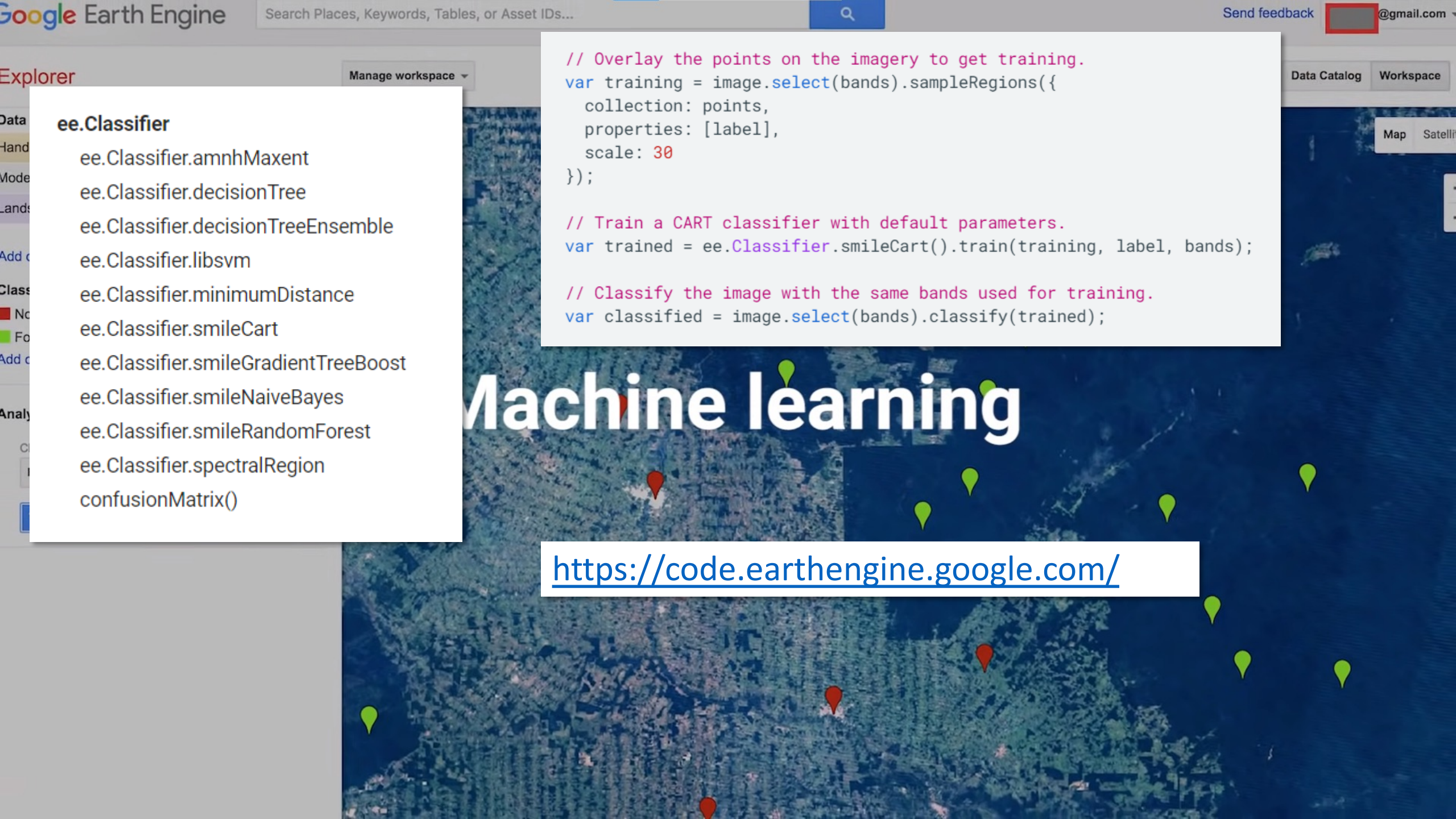
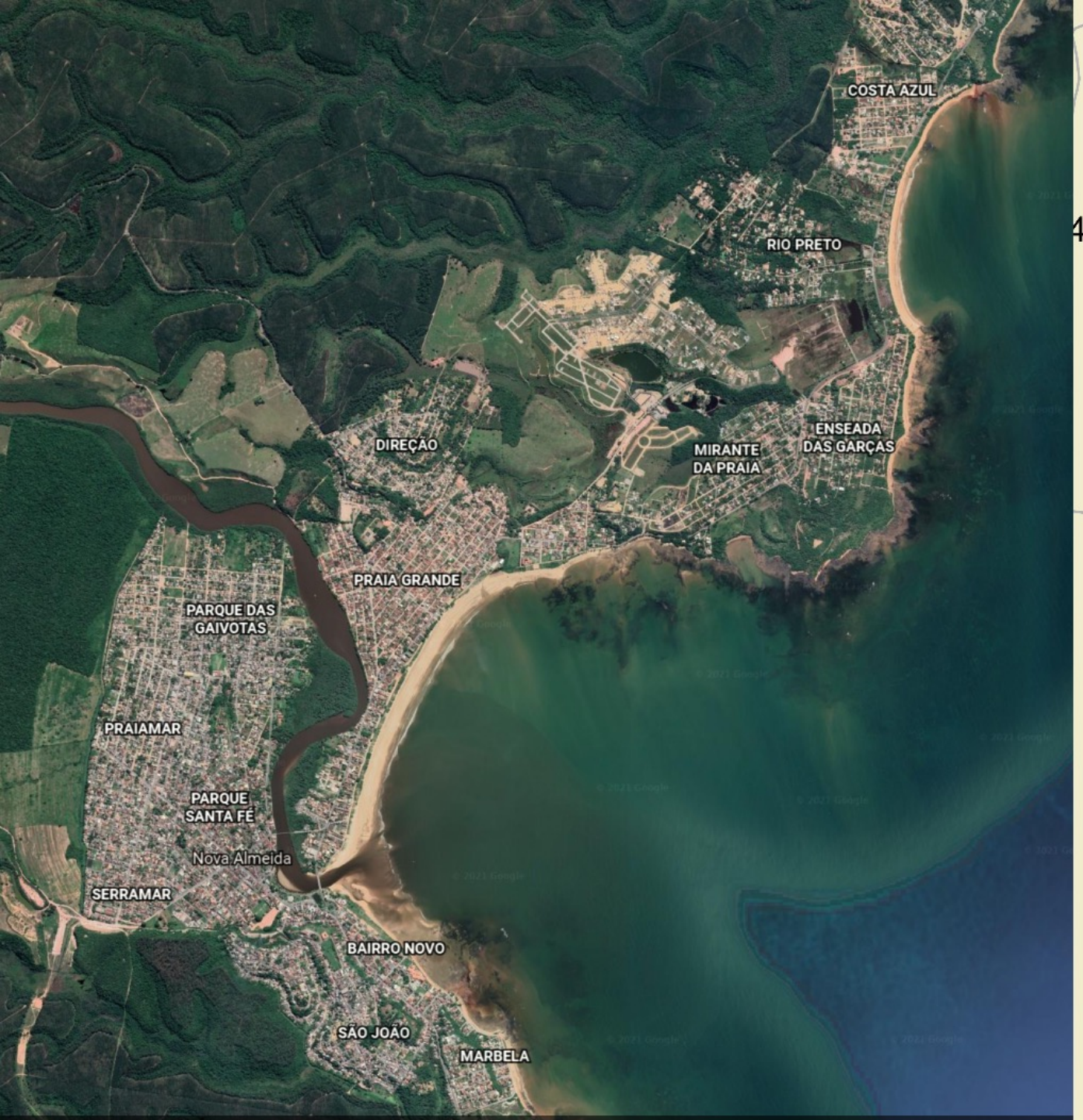
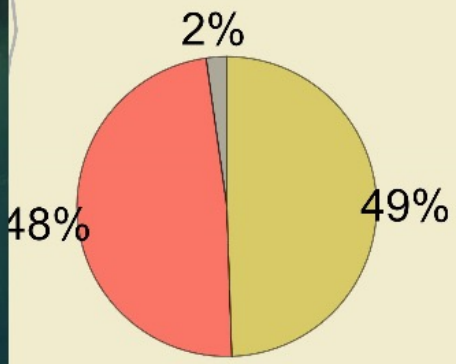
PQA_1




Google Earth Engine
Search Places, Keywords, Tables, or Asset IDs...
Send feedback
@gmail.com
Explorer
Manage workspace
Data Catalog
Workspace
Map
Satelli
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

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intertidalSentinel

Get Link | Save | Run | Reset | Apps

```
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([
```

Inspector | Console | Tasks

```
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
```

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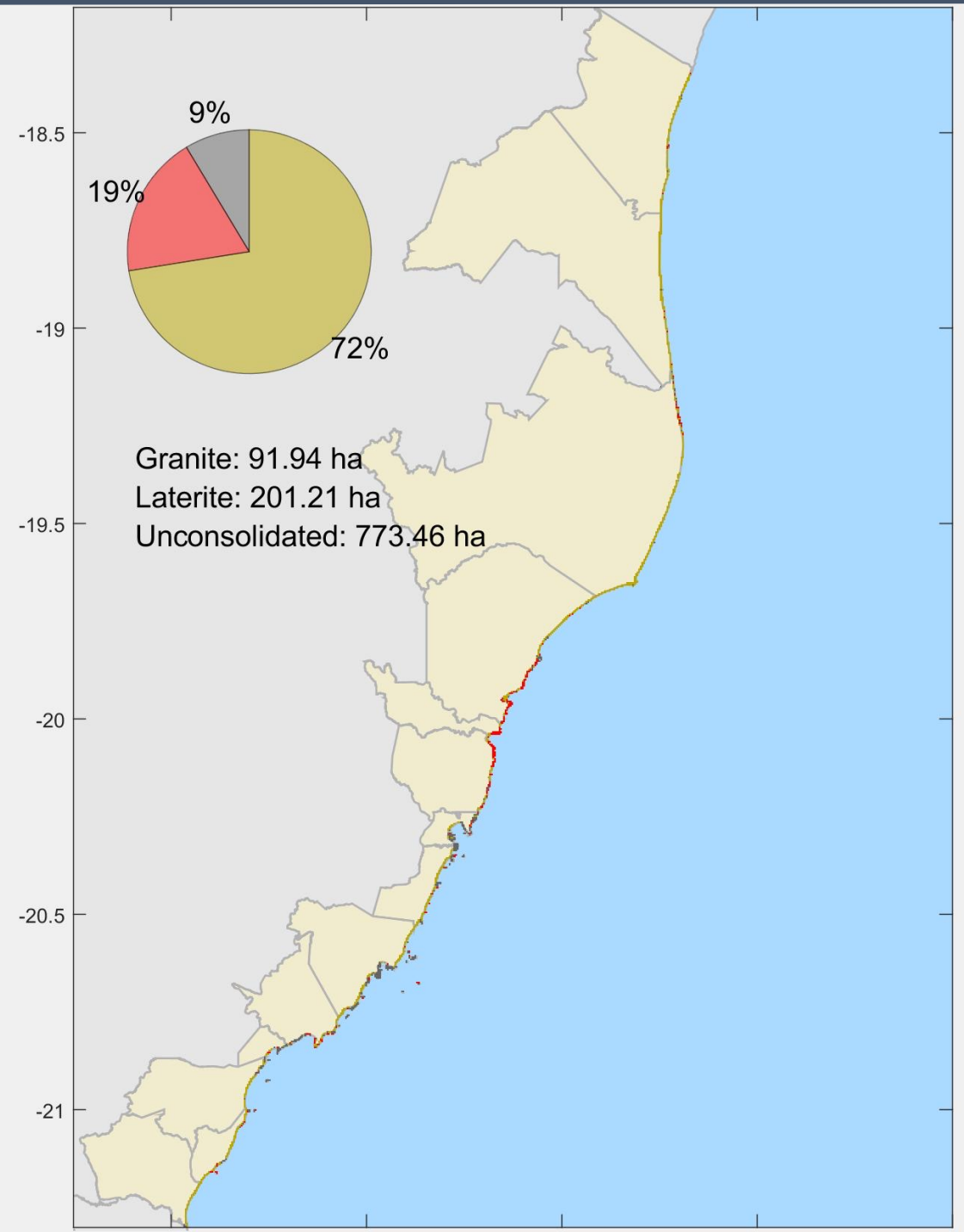

Obrigado!

ricardo.servino@ufes.br