

Annex. A: GEE VI codes

The screenshot displays the Google Earth Engine (GEE) console interface. The main area shows a JavaScript script for calculating various vegetation indices (VI) from Landsat data. The script includes functions for selecting bands, calculating indices like NDVI, EVI, SAVI, RVI, and OSAVI, and applying scale factors. The right panel shows a visualization of the results, displaying a time series of the indices from October 2018 to July 2019. The indices are plotted as lines, with EVI and GNDVI showing the highest values, followed by SAVI, RVI, and OSAVI. The x-axis is labeled 'Image (labeled by system:time_start)' and the y-axis is labeled 'Normalized'.

```

1 var table = ee.Geometry(Map.getBounds(true))
2 var land = ee.ImageCollection("LANDSAT/LC08/C02/T1_L2")
3
4 var Indices = function(img) {
5   var NDVI = img.normalizedDifference(['SR_B5', 'SR_B4']).rename('NDVI')
6   var GNDVI = img.normalizedDifference(['SR_B5', 'SR_B3']).rename('GNDVI')
7   var EVI = img.expression('2.5 * ((B5-B4) / (B5 + 6 * B4 - 7.5 * B2 + 1))', {
8     'B5': img.select('SR_B5'),
9     'B4': img.select('SR_B4'),
10    'B2': img.select('SR_B2'),
11  }).rename('EVI')
12  var SAVI = img.expression('((B5 - B4) / (B5 + B4 + 0.5)) * (1.5)', {
13    'B5': img.select('SR_B5'),
14    'B4': img.select('SR_B4'),
15  }).rename('SAVI')
16  var RVI = img.expression('(B4 / B5)', {
17    'B5': img.select('SR_B5'),
18    'B4': img.select('SR_B4'),
19  }).rename('RVI')
20  var OSAVI = img.expression('((1+0.16)*(B5-B4))/(B5+B4+0.16)', {
21    'B5': img.select('SR_B5'),
22    'B4': img.select('SR_B4'),
23  }).rename('OSAVI')
24  return img.addBands(NDVI).addBands(EVI).addBands(SAVI).addBands(GNDVI).addBands(RVI).addBands(OSAVI)
25 }
26
27 function applyScaleFactors(image) {
28   var opticalBands = image.select('SR_B').multiply(0.0000275).add(-0.2)
29   var thermalBands = image.select('ST_B').multiply(0.00941892).add(149.0)
30   return image.addBands(opticalBands, null, true)
31     .addBands(thermalBands, null, true)
32 }
33
34 var maskClouds = function(img) {
35   var qa = img.select('QA_PIXEL')
36   var cloudShadow = bitwiseExtract(qa, 4)
37   var snow = bitwiseExtract(qa, 5).rename('snow')
38   var cloud = bitwiseExtract(qa, 6).not().rename('cloud')
39   return img.updateMask(
40     cloudShadow.not()
41     .and(cloud.not())
42     .and(snow.not())
43   )
44 }
45
46 var bitwiseExtract = function(value, fromBit, toBit) {
47   return value.rightShift(fromBit).and(1).leftShift(toBit)
48 }

```

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