

# Open-source projects for Earth Engine in Python, R, JavaScript, and Julia

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#EarthEngineSG

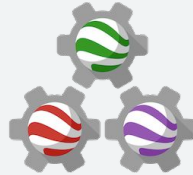
# Earth Engine Extensions



**QGIS Earth Engine Plugin** @gena et al. |  
*Integrates Google Earth Engine and QGIS using Python API*



**EarthEngine.jl**  
@KMarkert | *Google Earth Engine in Julia*



**Earth Engine API** |  
*Original APIs for Python and JavaScript (Code Editor)*



**geemap** @giswqs | A Python package for interactive mapping with Google Earth Engine, ipyleaflet, and ipywidgets



**rgee** @csaybar | rgee is an R binding package for calling Google Earth Engine API from within R



## Common EE Python code

```
def cloudMask(img):
    qa = img.select('QA60')
    cloudBitMask = 1 << 10
    cirrusBitMask = 1 << 11
    mask = qa.bitwiseAnd(cloudBitMask).eq(0)
        .And(qa.bitwiseAnd(cirrusBitMask).eq(0))
    return img.updateMask(mask)

def scale(img):
    scaling = img.select(["B.*"])
    x = scaling.multiply(0.0001)
    scaling = img.select(["AOT", "WVP"])
    x = x.addBands(scaling.multiply(0.001))
    notScaling = img.select(["SCL", "T.*", "M.*", "Q.*"])
    x = x.addBands(notScaling)
    return x

def addIndices(img):
    a = img.normalizedDifference(['B8', 'B4']).rename('NDVI')
    b = img.normalizedDifference(['B8', 'B3']).rename('GNDVI')
    c = img.normalizedDifference(['B3', 'B11']).rename('NDSI')
    return img.addBands([a,b,c])

S2 = ee.ImageCollection("COPERNICUS/S2_SR") \
    .map(cloudMask) \
    .map(scale) \
    .map(addIndices)
```

from  .....  to

## A more intuitive code



A python package that extends  
Google Earth Engine



```
S2 = ee.ImageCollection("COPERNICUS/S2_SR") \
    .maskClouds() \
    .scaleAndOffset() \
    .spectralIndices(["NDVI", "GNDVI", "NDSI"])
```

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# The eeExtra Ecosystem

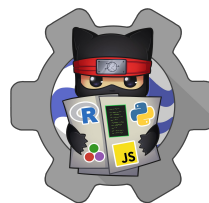
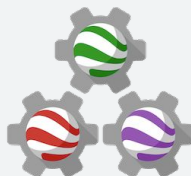
+ @csaybar (César Aybar Camacho)



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**EarthEngine.jl** @KMarkert | Google Earth Engine in Julia



**eeExtra** @davemlz @csaybar | A *ninja* python package that unifies the Google Earth Engine ecosystem



**eeMont** @davemlz | A python package that extends Google Earth Engine



**rgeeExtra** @csaybar | High-level functions to process spatial and simple Earth Engine objects



Resources that can be associated

Directly Associated Packages

# Unifying the Earth Engine Ecosystem



```
S2 = ee.ImageCollection("COPERNICUS/S2_SR") \  
  .maskClouds() \  
  .scaleAndOffset() \  
  .spectralIndices(["NDVI", "kNDVI"])
```



```
S2 <- ee$ImageCollection$Dataset$COPERNICUS_S2_SR %>%  
  ee_ImageCollection_maskClouds() %>%  
  ee_ImageCollection_scaleAndOffset() %>%  
  ee_ImageCollection_spectralIndex(c("NDVI", "kNDVI"))
```



```
S2 = EE.ImageCollection("COPERNICUS/S2_SR") |>  
  maskClouds |>  
  scaleAndOffset |>  
  x -> spectralIndices(x, ["NDVI", "kNDVI"]);
```



```
S2 <- ee$ImageCollection("COPERNICUS/S2_SR") %>%  
  ee$ImageCollection$maskClouds() %>%  
  ee$ImageCollection$scaleAndOffset() %>%  
  ee$ImageCollection$spectralIndices(c("NDVI", "kNDVI"))
```

# Experimental: From JS to the world



```
var LandsatLST = require("users/sofiaermida/landsat_smw_lst:modules/Landsat_LST.js");
```

JS



Translating code...



```
LandsatLST = ee.require("users/sofiaermida/landsat_smw_lst:modules/Landsat_LST.js")
```



```
LandsatLST <- module("users/sofiaermida/landsat_smw_lst:modules/Landsat_LST.js")
```



```
LandsatLST = ee.require("users/sofiaermida/landsat_smw_lst:modules/Landsat_LST.js")
```



**Contributions are welcome!**





# Thank you!

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