Mean day and night LST graph Google Earth Engine open-source code

(developed by authors for calculating the mean day and night LST during summer for the study area)

Northeast Italian viticulture affected by heat and vegetation stress. A Satellite-Based Study from 2000 to 2024

Vincenzo Baldan, Eugenio Straffelini, Vincenzo D’Agostino, and Paolo Tarolli (2025)

//import vinayards shapefile and NASA SRTM digital elevation 30 m dataset (srtm)

//define and map display the class (apply different condition according to the class //considered) in this case the steep class was generated. Follow the elevation and slope //conditions applied in the methodology of the current work. You can use this code for //generate the heroic class, appling the conditions. The slope is expressed in degree, was then //converted to percentage.

var slope = ee.Terrain.slope(srtm)

Map.addLayer(slope, {}, 'slope');

var classes = srtm.updateMask(

(srtm.lte(200).and(slope.lte(6.84))).or(slope.lte(6.84))

);

Map.addLayer(classes, {}, 'flat');

// Define elevation and slope conditions for steep class

var elevationCondition = srtm.gt(200).and(srtm.lt(500));

var slopeCondition = slope.gt(6.84).and(slope.lt(16.70));

// Mask for (elevation between 200-500 AND slope between 6.84-16.70) OR (slope between 6.84-16.70 regardless of elevation)

var class\_steep = srtm.updateMask(

elevationCondition.and(slopeCondition).or(slopeCondition)

);

Map.addLayer(class\_steep, {}, 'steep');

//import Modis dataset, select the variable (“LST\_Night\_1km” or “LST\_Day\_1km”) and filter by //the years and summer period.

var mod13 = ee.ImageCollection('MODIS/061/MOD11A2');

var coll = mod13.select('LST\_Night\_1km')

.filter(ee.Filter.calendarRange(2012, 2024, 'year')) //choose the period

.filter(ee.Filter.calendarRange(6, 8, 'month'))

.map(function(image){ return image.clip(table); }); // Clip to vineyard polygons

//Map.addLayer(coll, {}, 'coll')

//convert data from Kelvin to Celsius

var modLSTday = coll.map(function(img) {

return img.multiply(0.02).subtract(273.15).copyProperties(img, ['system:time\_start']);

});

// Apply elevation mask

var LST\_day\_mean\_mask = modLSTday.map(function(img) {

return img.updateMask(classes); // Only mask by elevation

});

//set, display the chart and export it as CSV file from the console

var chart = ui.Chart.image.series({

imageCollection: LST\_day\_mean\_mask,

region: table,

reducer: ee.Reducer.mean(),

scale: 1000,

xProperty: 'system:time\_start'

})

.setSeriesNames(['LST\_Vineyards\_flat\_night1224']) //

.setOptions({

title: 'LST Time Series for Vineyards (<=200,<=6.84) 2012-2024 day', //modify it according to //the class analyzed

hAxis: {title: 'Date', titleTextStyle: {italic: false, bold: true}},

vAxis: {title: 'LST (°C)', titleTextStyle: {italic: false, bold: true}},

lineWidth: 5,

colors: ['e37d05'],

curveType: 'function'

});

print(chart);