Sen’s slope day or night LST 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 study area boundaries

//import MODIS LST data and select “'LST\_Night\_1km” or “'LST\_Day\_1km” according to the //variable you want analyze

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

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

//filter the dataset for summer and clip it with the study area (table)

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

.map(function(image){return image.clip(table)});

///////////////////////////////////////////////////////////////////////////////////////////////

//calculate the Sen’s slope

var afterFilter = ee.Filter.lessThan({

leftField: 'system:time\_start',

rightField: 'system:time\_start'

});

var joined = ee.ImageCollection(ee.Join.saveAll('after').apply({

primary: coll,

secondary: coll,

condition: afterFilter

}));

var slope = function(i, j) {

return ee.Image(j).subtract(i)

.divide(ee.Image(j).date().difference(ee.Image(i).date(), 'days'))

.rename('slope')

.float();

};

var slopes = ee.ImageCollection(joined.map(function(current) {

var afterCollection = ee.ImageCollection.fromImages(current.get('after'));

return afterCollection.map(function(image) {

return ee.Image(slope(current, image));

});

}).flatten());

var sensSlope = slopes.reduce(ee.Reducer.median(), 2); // Set parallelScale.

//clip it with the study area and display the map

var senSlope\_clip = sensSlope.clip(table)

Map.addLayer(senSlope\_clip, '', 'sensSlope');

// // Export the map

Export.image.toDrive({

image: senSlope\_clip,

description:'LST\_night\_senslope\_0024',

region: table.geometry().bounds(),

scale: 1000,

crs: 32632,

maxPixels: 1e13})