// create a bounding box of your study area and name it “geometry” then follow the code

function returnFloat(img){

return img.float()};

// import virrs data

var DMSP = ee.ImageCollection("NOAA/DMSP-OLS/NIGHTTIME\_LIGHTS").select(["avg\_vis"],["nightlight"]).map(returnFloat)

var a = 14.758;

var b = 0.448;

// apply power relation to viirs data

// from here: https://www.iirs.gov.in/iirs/sites/default/files/StudentThesis/S\_6027253\_Reshma\_Jeswani\_MSc\_Thesis.pdf

// maybe use log function instead.

function scaleNL(img){

var t = img.get("system:time\_start");

img = img.where(img.lt(0.001),0.001);

return ee.Image(ee.Image(a).multiply(img.pow(b))).set("system:time\_start",t).rename("nightlight").float();

}

// import virrs data

var viirs = ee.ImageCollection("NOAA/VIIRS/DNB/MONTHLY\_V1/VCMSLCFG").select("avg\_rad").map(scaleNL);

// combine dataseries

var nightlights = DMSP.merge(viirs);

print(nightlights)

// This field contains UNIX time in milliseconds.

var timeField = 'system:time\_start';

// select nighlights band

var modeled = ee.ImageCollection(nightlights.select(['nightlight']));

// Smoothing ---------------------------------------------------------------

var join = ee.Join.saveAll({

matchesKey: 'images'

});

var diffFilter = ee.Filter.maxDifference({

difference: 1000 \* 60 \* 60 \* 24 \*365,

leftField: timeField,

rightField: timeField

});

var threeNeighborJoin = join.apply({

primary: modeled,

secondary: modeled,

condition: diffFilter

});

// smooth image collection

var smoothed = ee.ImageCollection(threeNeighborJoin.map(function(image) {

var collection = ee.ImageCollection.fromImages(image.get('images'));

return ee.Image(image).addBands(collection.mean().rename('mean'));

}));

// set display parameters

var display = {

title: "نور شب",

fontSize: 12,

hAxis: {title: 'سال'},

vAxis: {title: "avg\_vis"}};

// add chart

print(ui.Chart.image.series(

smoothed.select(['nightlight', 'mean']), geometry, ee.Reducer.mean(), 30)

.setSeriesNames(['میانگین','نور شب ' ])

.setOptions({

title: 'smoothed',

lineWidth: 1,

pointSize: 3,

}));

// set viz paramater

var viz = {min:0, max:50, palette:['000000','700000','808080','FFFF00','ffffff','ffffff','ffffff']};

// get the 1995 and 2020 image

var img1995 = smoothed.filterDate(ee.Date.fromYMD(1995,1,1),ee.Date.fromYMD(1995,12,31));

var img2020 = smoothed.filterDate(ee.Date.fromYMD(2020,1,1),ee.Date.fromYMD(2020,12,31));

// add the maps

Map.addLayer(ee.Image(img1995.first().select("mean")),viz,"1995");

Map.addLayer(ee.Image(img2020.first().select("mean")),viz,"2020");