### IMPORTS

**var** soil **=** **ee.Image**("projects/ee-dharmisha-siddharth/assets/HYSOGs250m"),

srtm **=** **ee.Image**("CGIAR/SRTM90\_V4"),

srtm2 **=** **ee.Image**("USGS/SRTMGL1\_003"),

angul **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/rdf\_revised\_pcraster\_angul"),

mandalgarh **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/rdf\_revised\_pcraster\_mandalgarh"),

masalia **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/rdf\_revised\_pcraster\_masalia"),

mohanpur **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/rdf\_revised\_pcraster\_mohanpur"),

pindwara **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/rdf\_revised\_pcraster\_pindwara"),

angul2 **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/angul\_subbasin\_24\_mahanadi"),

manendragarh **=** **ee.FeatureCollection**("projects/ee-anz208490/assets/manendragarh\_subbasin\_1\_mahanadi");

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var start\_dates = ee.List([

'2017-07-01',

'2018-07-01',

'2019-07-01',

'2020-07-01',

'2021-07-01',

'2022-07-01',

'2023-07-01',

]);

var end\_dates = ee.List([

'2017-10-31',

'2018-10-31',

'2019-10-31',

'2020-10-31',

'2021-10-31',

'2022-10-31',

'2023-10-31',

]);

var band\_names = [

'a\_2017-07-01',

'a\_2018-07-01',

'a\_2019-07-01',

'a\_2020-07-01',

'a\_2021-07-01',

'a\_2022-07-01',

'a\_2023-09-01'];

var allImages = ee.List([]);

//var shape = ee.FeatureCollection("projects/ee-siy237536/assets/aquifer\_sampled\_mws/alluvium/mws\_alluvium\_aquifer\_block\_8")

var shape = ee.FeatureCollection("projects/ee-aatif/assets/Pindwara\_mws")

var geometry = shape.geometry();

var gayaDEM = srtm2.clip(geometry);

// Calculating Slope

var slope = ee.Terrain.slope(gayaDEM);

// var fc = ee.FeatureCollection(shape);

var size = shape.size();

var size1 = ee.Number(size).subtract(ee.Number(1));

// fc = ee.List(fc.toList(size));

var soil = soil.expression(

"(b('b1') == 14) ? 4" +

": (b('b1') == 13) ? 3" +

": (b('b1') == 12) ? 2" +

": (b('b1') == 11) ? 1" +

": b('b1')"

).rename('soil');

soil = soil.clip(shape).rename('soil').reproject({

crs:'EPSG:4326',

scale:30}

);

var sy = ee.List(start\_dates);

var ey = ee.List(end\_dates);

var mws = ee.List.sequence(0,size1);

//\*\*\*\*\* LOOP \*\*\*\*\*//

for(var k= 0;k<7;k++)

{

var sd = sy.get(k);

var ed = ey.get(k);

var lulc=ee.ImageCollection('GOOGLE/DYNAMICWORLD/V1').filterDate(sd, ed);

var classification = lulc.select('label');

var dwComposite = classification.reduce(ee.Reducer.mode());

dwComposite = dwComposite.clip(shape).rename('label').reproject({

crs:'EPSG:4326',

scale:30}

);

lulc = dwComposite.rename(['lulc']);

var lulc\_soil = lulc.addBands(soil);

lulc\_soil=lulc\_soil.unmask(0);

var CN2 = lulc\_soil.expression(

"(b('soil') == 1) and(b('lulc')==0) ? 0" +

": (b('soil') == 1) and(b('lulc')==1) ? 30" +

": (b('soil') == 1) and(b('lulc')==2) ? 39" +

": (b('soil') == 1) and(b('lulc')==3) ? 0" +

": (b('soil') == 1) and(b('lulc')==4) ? 64" +

": (b('soil') == 1) and(b('lulc')==5) ? 39" +

": (b('soil') == 1) and(b('lulc')==6) ? 82" +

// Take a look at built-up once, I averaged everything.

": (b('soil') == 1) and(b('lulc')==7) ? 49" +

// ": (b('soil') == 1) and(b('lulc')==8) ? 45" +

// Not considerting LULC 8 since it is for snow and ice

": (b('soil') == 2) and(b('lulc')==0) ? 0" +

": (b('soil') == 2) and(b('lulc')==1) ? 55" +

": (b('soil') == 2) and(b('lulc')==2) ? 61" +

": (b('soil') == 2) and(b('lulc')==3) ? 0" +

": (b('soil') == 2) and(b('lulc')==4) ? 75" +

": (b('soil') == 2) and(b('lulc')==5) ? 61" +

": (b('soil') == 2) and(b('lulc')==6) ? 88" +

": (b('soil') == 2) and(b('lulc')==7) ? 69" +

// ": (b('soil') == 2) and(b('lulc')==8) ? 66" +

": (b('soil') == 3) and(b('lulc')==0) ? 0" +

": (b('soil') == 3) and(b('lulc')==1) ? 70" +

": (b('soil') == 3) and(b('lulc')==2) ? 74" +

": (b('soil') == 3) and(b('lulc')==3) ? 0" +

": (b('soil') == 3) and(b('lulc')==4) ? 82" +

": (b('soil') == 3) and(b('lulc')==5) ? 74" +

": (b('soil') == 3) and(b('lulc')==6) ? 91" +

": (b('soil') == 3) and(b('lulc')==7) ? 79" +

// ": (b('soil') == 3) and(b('lulc')==8) ? 77" +

" : (b('soil') == 4) and(b('lulc')==0) ? 0" +

": (b('soil') == 4) and(b('lulc')==1) ? 77" +

": (b('soil') == 4) and(b('lulc')==2) ? 80" +

": (b('soil') == 4) and(b('lulc')==3) ? 0" +

": (b('soil') == 4) and(b('lulc')==4) ? 85" +

": (b('soil') == 4) and(b('lulc')==5) ? 80" +

": (b('soil') == 4) and(b('lulc')==6) ? 93" +

": (b('soil') == 4) and(b('lulc')==7) ? 84" +

// ": (b('soil') == 4) and(b('lulc')==8) ? 83" +

": (b('soil') == 0) ? 0" +

": 0"

).rename('CN2');

CN2 = CN2.clip(shape).rename('CN2').reproject({

crs:'EPSG:4326',

scale:30}

);

var CN1 = CN2.expression(

'-75\*CN2/(CN2-175)',{

'CN2': CN2.select('CN2')

}).rename('CN1');

CN1 = CN1.clip(shape).rename('CN1').reproject({

crs:'EPSG:4326',

scale:30}

);

var CN3 = CN2.expression(

'CN2\*((2.718)\*\*(0.00673\*(100-CN2)))',{

'CN2': CN2.select('CN2')

}).rename('CN3');

CN3 = CN3.clip(shape).rename('CN3').reproject({

crs:'EPSG:4326',

scale:30}

);

slope=slope.rename("slope");

slope = slope.clip(shape).rename('slope').reproject({

crs:'EPSG:4326',

scale:30}

);

var part1=CN3.select('CN3').subtract(CN2.select('CN2')).divide(ee.Number(3)).rename("p1");

part1 = part1.clip(shape).rename('p1').reproject({

crs:'EPSG:4326',

scale:30}

);

var part2 = slope.expression(

'1-(2\*(2.718)\*\*(-13.86\*slope))',{

'slope': slope.select('slope')

}).rename('p2');

part2 = part2.clip(shape).rename('p2').reproject({

crs:'EPSG:4326',

scale:30}

);

var CN2a = slope.expression(

'p1\*p2+CN2',{

'p1': part1.select('p1'),

'p2': part2.select('p2'),

'CN2': CN2.select('CN2')

}).rename('CN2a');

CN2a = CN2a.clip(shape).rename('CN2a').reproject({

crs:'EPSG:4326',

scale:30}

);

var CN1a = CN2a.expression(

'4.2\*CN2a/(10-0.058\*CN2a)',{

'CN2a': CN2a.select('CN2a')

}).rename('CN1a');

CN1a = CN1a.clip(shape).rename('CN1a').reproject({

crs:'EPSG:4326',

scale:30}

);

var CN3a = CN2a.expression(

'23\*CN2a/(10+0.13\*CN2a)',{

'CN2a': CN2a.select('CN2a')

}).rename('CN3a');

CN3a = CN3a.clip(shape).rename('CN3a').reproject({

crs:'EPSG:4326',

scale:30}

);

var sr1 = CN1a.expression(

'(25400/CN1a)-254', {

'CN1a': CN1a.select('CN1a')

}).rename('sr1');

sr1 = sr1.clip(shape).rename('sr1').reproject({

crs:'EPSG:4326',

scale:30}

);

var sr2 = CN2a.expression(

'(25400/CN2a)-254', {

'CN2a': CN2a.select('CN2a')

}).rename('sr2');

sr2 = sr2.clip(shape).rename('sr2').reproject({

crs:'EPSG:4326',

scale:30}

);

var sr3 = CN3a.expression(

'(25400/CN3a)-254', {

'CN3a': CN3a.select('CN3a')

}).rename('sr3');

sr3 = sr3.clip(shape).rename('sr3').reproject({

crs:'EPSG:4326',

scale:30}

);

for(var n = 0; n<26;n++)

{

var s = start\_dates.get(n+(k\*26));

var e = end\_dates.get(n+(k\*26));

var base = ee.Date(e);

var ant = function(i)

{

var a = ee.Number(i).multiply(ee.Number(-1));

var b = (ee.Number(i).multiply(ee.Number(-1))).subtract(ee.Number(1));

var c = (ee.Number(i).multiply(ee.Number(-1))).subtract(ee.Number(4));

var dtTo = base.advance(a, 'day').format('YYYY-MM-dd');

var dtMid = base.advance(b, 'day').format('YYYY-MM-dd');

var dtFrom = base.advance(c, 'day').format('YYYY-MM-dd');

var dataset = ee.ImageCollection('JAXA/GPM\_L3/GSMaP/v6/operational')

.filter(ee.Filter.date(dtFrom, dtTo));

var antecedent = dataset.reduce(ee.Reducer.sum());

antecedent = antecedent.clip(shape).select('hourlyPrecipRate\_sum').reproject({

crs:'EPSG:4326',

scale:30}

);

var M2 = CN2a.expression(

'0.5\*(-sr+sqrt(sr\*\*2+4\*p\*sr))', {

'sr': sr2.select('sr2'),

'p':antecedent.select('hourlyPrecipRate\_sum')

}).rename('m2');

M2 = M2.clip(shape).rename('m2').reproject({

crs:'EPSG:4326',

scale:30}

);

var M1 = CN2a.expression(

'0.5\*(-sr+sqrt(sr\*\*2+4\*p\*sr))', {

'sr': sr1.select('sr1'),

'p':antecedent.select('hourlyPrecipRate\_sum')

}).rename('m1');

M1 = M1.clip(shape).rename('m1').reproject({

crs:'EPSG:4326',

scale:30}

);

var M3 = CN2a.expression(

'0.5\*(-sr+sqrt(sr\*\*2+4\*p\*sr))', {

'sr': sr3.select('sr3'),

'p':antecedent.select('hourlyPrecipRate\_sum')

}).rename('m3');

M3 = M3.clip(shape).rename('m3').reproject({

crs:'EPSG:4326',

scale:30}

);

dataset = ee.ImageCollection('JAXA/GPM\_L3/GSMaP/v6/operational')

.filter(ee.Filter.date(dtMid, dtTo));

var total = dataset.reduce(ee.Reducer.sum());

total = total.clip(shape).select('hourlyPrecipRate\_sum').reproject({

crs:'EPSG:4326',

scale:30}

);

var runoff = total.expression(

'(P>=0.2\*sr1) and (P5>=0) and (P5<=35) and (((P-0.2\*sr1)\*(P-0.2\*sr1+m1))/(P+0.2\*sr1+sr1+m1))>=0? ((P-0.2\*sr1)\*(P-0.2\*sr1+m1))/(P+0.2\*sr1+sr1+m1)' +

': (P>=0.2\*sr2) and (P5>=0) and (P5>35) and (((P-0.2\*sr2)\*(P-0.2\*sr2+m2))/(P+0.2\*sr2+sr2+m2))>=0 ? ((P-0.2\*sr2)\*(P-0.2\*sr2+m2))/(P+0.2\*sr2+sr2+m2)' +

': (P>=0.2\*sr3) and (P5>=0) and (P5>52.5) and (((P-0.2\*sr3)\*(P-0.2\*sr3+m3))/(P+0.2\*sr3+sr3+m3))>=0 ? ((P-0.2\*sr3)\*(P-0.2\*sr3+m3))/(P+0.2\*sr3+sr3+m3)' +

':0',

{

'P':total.select('hourlyPrecipRate\_sum'),

'm1':M1.select('m1'),

'm2':M2.select('m2'),

'm3':M3.select('m3'),

'P5':antecedent.select('hourlyPrecipRate\_sum'),

'sr2':sr2.select('sr2'),

'sr1':sr1.select('sr1'),

'sr3':sr3.select('sr3')

}).rename('runoff');

// runoffs=runoffs.add(runoff);

return runoff

}

var ll = ee.List.sequence(0,14);

var runoffs = ll.map(ant);

runoffs=ee.ImageCollection(runoffs)

var runoffTotal = runoffs.reduce(ee.Reducer.sum());

runoffTotal = runoffTotal.clip(shape).select('runoff\_sum').reproject({

crs:'EPSG:4326',

scale:30}

);

var total=runoffTotal;

total = total.clip(shape);

total = total.select('runoff\_sum');

total = total.expression('p\*30\*30',{

'p': total.select('runoff\_sum')

}).rename('p');

var description = "pindwara\_runoff\_fortnightly\_" + band\_names[n+(k\*26)] // Change name of the asset description

var assetId = "projects/ee-aatif/assets/Runoff\_fortnightly/" + description // Change asset path

var exportOptions = {

image : total,

assetId: assetId,

description: description, // Name for the exported image

region: shape,

scale: 30,

maxPixels: 1e13, // Set an appropriate maxPixels value

};

Export.image.toAsset(exportOptions);

// allImages = allImages.add(total.clip(shape));

// var stats2 = total.reduceRegions({

// reducer: ee.Reducer.sum(),

// collection: shape,

// scale: 30,

// });

// var statsl = ee.List(stats2.toList(size));

// var l = ee.List([]);

// var res = function(m){

// var f = ee.Feature(statsl.get(m));

// // var ar = ee.Number(f.area());

// var id = f.get('Area');

// var feat = ee.Feature(shape.filter(ee.Filter.eq('Area', id)). first());

// // var id = f.get('Area');

// // var feat = ee.Feature(shape.filter(ee.Filter.eq('Area', id)). first());

// var val = ee.Number(f.get('sum'));

// var a = ee.Number(feat.area());

// val = val.divide(a);

// return feat.set(s,val);

// // ee.Algorithms.If(ar<900,feat = feat.set(e,0), feat = feat.set(e,val));

// // return feat;

// };

// shape = ee.FeatureCollection(mws.map(res));

}

}

// allImages = ee.ImageCollection(allImages);

// allImages = ee.Image(allImages.toBands());

// allImages = ee.Image((allImages.rename(band\_names)));

// Export.image.toAsset({

// image: ee.Image(allImages),

// description: 'masalia\_RO\_fortnightly',

// assetId: 'projects/ee-dharmisha-siddharth/masalia\_RO\_fortnightly/assets/masalia\_RO\_fortnightly',

// // fileFormat: 'shp',

// //selectors: ['hourlyPrecipRate','.geo'],

// scale: 30,

// maxPixels: 1e13

// });

// print(shape)

// // print(fc);

// // var final = ee.FeatureCollection(fc);

// Export.table.toAsset({

// collection: shape,

// description:'RO',

// assetId: 'projects/ee-dharmisha-siddharth/assets/Fortnight\_RO\_Masalia'

// });