

<https://code.earthengine.google.com/?scriptPath=users%2Fsangpohal%2FMandi%3A31.6946%2C%2076.93686>

```
// Define AOI
var AOI = ee.Geometry.Rectangle([76.8, 31.5, 77.1, 31.8]);
Map.centerObject(AOI, 11);
Map.addLayer(AOI, {color: 'red'}, 'AOI');

// Load Sentinel-1 SAR data (descending orbit, VV polarization)
var sentinel1 = ee.ImageCollection('COPERNICUS/S1_GRD')
  .filterBounds(AOI)
  .filterDate('2023-01-01', '2025-05-31')
  .filter(ee.Filter.eq('instrumentMode', 'IW'))
  .filter(ee.Filter.listContains('transmitterReceiverPolarisation', 'VV'))
  .filter(ee.Filter.eq('orbitProperties_pass', 'DESCENDING'))
  .select('VV');

// Compute monthly means for Jan 2023 to May 2025 (3 years = 29 months)
var months = ee.List.sequence(0, 35); // 29 months

var monthlyMean = ee.ImageCollection(months.map(function(n) {
  var start = ee.Date('2023-01-01').advance(n, 'month');
  var end = start.advance(1, 'month');
  var monthlyCollection = sentinel1.filterDate(start, end);

  return ee.Algorithms.If(
    monthlyCollection.size().gt(0),
    monthlyCollection.mean().set('system:time_start', start.millis()),
    null
  );
})).filter(ee.Filter.notNull(['system:time_start']));

// Check if monthlyMean collection is empty
var isEmpty = monthlyMean.size().eq(0);
isEmpty.evaluate(function(emptyCheck) {
  if(emptyCheck) {
    print('No monthly mean images were generated. Adjust date range or AOI.');
  } else {
    // Baseline image (first available month in 2023)
    var baseline = ee.Image(monthlyMean.first());

    // Compute displacement relative to baseline
    var displacement = monthlyMean.map(function(image) {
      return ee.Image(image).subtract(baseline)
        .set('system:time_start', ee.Image(image).get('system:time_start'));
    });

    // Select December 2024 displacement
  }
});
```

```

var Dec2024 = displacement.filterDate('2023-12-01', '2025-05-31').first();

// Check if Dec 2024 image exists and display
ee.Algorithms.If(Dec2024,
  Map.addLayer(Dec2024, {
    min: -0.1,
    max: 0.1,
    palette: ['blue', 'white', 'red'],
  }, 'Subsidence Dec 2024'),
  print('No image data available for May 2025.')
);

// Point-based time series analysis
var point = ee.Geometry.Point([76.93686, 31.6946]);
var chart = ui.Chart.image.series({
  imageCollection: displacement,
  region: point,
  reducer: ee.Reducer.mean(),
  scale: 10
}).setOptions({
  title: 'Time Series of Land Subsidence (2023–2024)',
  vAxis: {title: 'Displacement (relative to Jan 2023, VV backscatter diff)'},
  hAxis: {title: 'Time'},
  lineWidth: 2,
  pointSize: 4,
});
print(chart);
Map.addLayer(point, {color: 'yellow'}, 'Analysis Point');
}
));

```