

Example ECOSTRESS scene that needed both latitude and longitude shift for correct geolocation

Steps using Level-2 data ordered from Earthdata Search (not AppEARS)

1. Open ECOSTRESS Level-2 LST and Geolocation data
2. Geolocate data to pre-defined WGS84 grid over chosen area (e.g. LA)
3. Output to geotiff
4. Open geotiff in QGIS and compare to background Google satellite basemap
5. Make manual correction as needed to L1B_GEO lat, lon data
6. Recheck alignment in QGIS
7. Repeat as needed...

1. Matlab

```
fl2 = 'ECOSTRESS_L2_LSTE_11712_012_20200730T061029_0601_01.h5';
fl1GEO = 'ECOSTRESS_L1B_GEO_11712_012_20200730T061029_0601_01.h5';

% Read data
LST = hdf5read(fl2,'/SDS/LST','V71Dimensions',true);
LST = double(LST).*0.02;

Lat = double(hdf5read(fl1GEO,'/Geolocation/latitude','V71Dimensions',true));
Lon = double(hdf5read(fl1GEO,'/Geolocation/longitude','V71Dimensions',true));

% Geolocate data to set grid:
% Limits of study area LA basin
minlat = 33.5; maxlat = 34.35;
minlon = -118.74; maxlon = -117.6;

% 70m ECOSTRESS grid
lats = minlat:0.0007:maxlat;
lons = minlon:0.0007:maxlon;

[latg,long] = meshgrat(lats,lons);
latg = flipud(latg);

LSTgrid = griddata(Lat,Lon,LST,latg,long,'cubic');

% Output geotiff
latlim = [min(latg(:)) max(latg(:))];
lonlim = [min(long(:)) max(long(:))];
rasterSize = size(latg);
R = georefcells(latlim,lonlim,rasterSize,'ColumnsStartFrom','north');

fileswrite = ['ECOSTRESS_LST_70m.tif'];
geotiffwrite(fileswrite,LSTgrid,R);
```

2. QGIS

Open QGIS Desktop 3.12.2

Project – New

Layer – Add layer – Add Raster layer – choose geotiff file

HGMGIS – Basemap – Google Satellite

Right click image layer – properties

Symbology – Singleband pseudocolor – spectral color ramp – click arrow – invert color ramp

Transparency – 50-80% (change to your liking)

Now find any linear features in your image that run N-S and E-W, e.g. roads, bridges, coastlines etc. Lakes and bodies of water are ideal since the temperatures are usually cooler and have a good contrast.

Estimate by how many pixels are offset in both N-S and E-W directions.

3. Back to Matlab

```
Lat = double(hdf5read(fL1GEO,'/Geolocation/latitude','V71Dimensions',true));
```

```
Lon = double(hdf5read(fL1GEO,'/Geolocation/longitude','V71Dimensions',true));
```

In this case I found that ECOSTRESS was shifted by almost 3 pixels in the easterly direction and just more than 1 pixel in the southerly direction, requiring a modification to both latitude and longitude as follows (0.0007 in degrees is approximately 70m, but this will depend on location on a WGS84 equal-angle grid system)

```
lonshift = -0.002;
```

```
latshift = 0.001;
```

```
Lon = Lon+lonshift;
```

```
Lat = Lat+latshift;
```

Now proceed as normal with updated Lat/Lon for gridding or exporting etc.