Subject: GOES Follow-up Question
Posted by David Fanning on Tue, 18 Mar 2008 17:08:09 GMT
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Folks,

OK, I have warped my GOES image into an Albers Equal Area Projection.

```
Map_Set, -2.99379, -75.0282, /Albers, $
   XMargin=0, YMargin=0, STANDARD_PARALLEL=[-19, 21], $
   LIMIT=[-3.0347, -97.5755,  12.7686, -75.0291, $
        -3.0343, -52.5294, -19.1762, -75.0302]
warp = Map_Patch(peruimage, peru_lon, peru_lat)
```

All well and good.

Now, I wish to save this warped image, which is in a map projection, into a GeoTiff file so I can display it in ENVI. :-)

I believe I know how to do this. I just need to project the lat/lon values I have into UV space so I can create a GeoTag structure. Easily done.

```
alberMap = MAP_PROJ_INIT('Albers Equal Area Conic', $
  DATUM=8, $ ; WGS84
  CENTER_LAT=-2.99379, $
  CENTER_LON=-75.0282, $
  STANDARD_PAR1=-19, $
  STANDARD_PAR2=20)

uv = MAP_PROJ_FORWARD([peru_lon[0,0], peru_lon[0,861], $
                  peru_lon[1199, 861], peru_lon[1199, 0]], $
                 [peru_lat[0,0], peru_lat[0,861], $
                  peru_lat[1199, 861], peru_lat[1199, 0]], $
                  MAP_STRUCTURE=alberMap)
```

Here are the corners of my image in lat/lon and in UV coordinates, clockwise from lower-left:

Lat/Lon in Creation Program
```
   -99.3065     -19.4763
   -98.2939      12.9533
   -51.8151      12.9516
   -50.8084     -19.4735
```

UV lat/lon in Creation Program
```
    -2555579.0      -1894676.3
```

```
-2436402.2       1875559.7
 2430893.3       1875344.8
 2549426.7      -1894388.0
```

Looks good to me. So I then create the tie-points and scales
for my image:

```
s = Size(warp, /DIMENSIONS)
xscale = Abs(uv[0,0] - uv[0,2]) / s[0]
yscale = Abs(uv[1,0] - uv[1,2]) / s[1]
tp = [uv[0,1], uv[1,1]]
```

Here are the values (tie-point in upper-left, as usual):

```
Scales in Creation Program          4155.3935       4525.8355
Tie Point in Creation Program:     -2436402.2       1875559.7
```

Then I create the geotag information and write the file:

```
geotag = { MODELPIXELSCALETAG: [xscale, yscale, 0], $
           MODELTIEPOINTTAG: [ 0, 0, 0, tp, 0], $
           GTMODELTYPEGEOKEY: 1, $
           GTRASTERTYPEGEOKEY: 1, $
           GEOGRAPHICTYPEGEOKEY: 4326, $
           GEOGLINEARUNITSGEOKEY: 9001, $
           GEOGANGULARUNITSGEOKEY: 9102, $
           PROJECTEDCSTYPEGEOKEY: 32767, $
           PROJECTIONGEOKEY: 32767, $
           PROJCOORDTRANSGEOKEY: 11, $
           PROJLINEARUNITSGEOKEY: 9001, $
           PROJSTDPARALLEL1GEOKEY: -19.00000, $
           PROJSTDPARALLEL2GEOKEY: 21.000000, $
           PROJNATORIGINLONGGEOKEY: -75.0282, $
           PROJNATORIGINLATGEOKEY: -2.99379, $
           PROJFALSEEASTINGGEOKEY: 0, $
           PROJFALSENORTHINGGEOKEY: 0 }

Write_TIFF, 'alber_peru.tif', Reverse(warp, 2), GEOTIFF=geotag
```

Next, I read the file, get the scales and tie point out of it.
They are the same as what I put in. And I use that information
to calculate the corner points of the image, like this.

```
xscale  = geotag.ModelPixelScaleTag[0]
yscale  = geotag.ModelPixelScaleTag[1]
tp      = geotag.ModelTiePointTag[3:4]
xOrigin = tp[0]
```

```
yOrigin = tp[1] - (yscale * s[1])
xEnd = xOrigin + (xscale * s[0])
yEnd = tp[1]
uv = [[xorigin, yorigin], [xorigin, yend], $
     [xend, yend], [xend, yorigin]]
```

When I print these out:

Corner Coordinates in Display Program:

```
-2436402.2     -1894461.3
-2436402.2      1875559.7
 2550070.1      1875559.7
 2550070.1     -1894461.3
```

These are *not* the same as what I had before:

UV lat/lon in Creation Program

```
-2555579.0     -1894676.3
-2436402.2      1875559.7
 2430893.3      1875344.8
 2549426.7     -1894388.0
```

Clearly, the xscale and yscale values are wrong, since the tie point (the 2nd value) is in the right place.

Why are they wrong? Subtle manipulation gets them no closer. They are very wrong. The xscale value needs to be something like 4059.46, rather than 4155.3935 for example.

The original image size is 1200x862. The warped image size is 1199x832. I use the warped image size in the scale equations, since that is the image I am saving in the TIFF file and the one that is in the map projection.

The one assumption I make that I cannot prove is that the corners of the warped image have the same lat/lon value as the corners of the unwarped GOES image and the same center. Is this assumption valid?

If not, how can I determine the corner lat/lons of the warped image?

(Usually, I have discovered my error if I have written this much, but not this time, so I must be really stumped.)

Cheers,

David

--
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Coyote's Guide to IDL Programming: http://www.dfanning.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")
