
Subject: map_proj_* help

Posted by [mankoff](#) on Sun, 07 Jun 2009 16:55:10 GMT

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Dear Mapping Experts,

I began converting from using map_set to map_proj_* about a year ago. I've used it successfully in a few situations, but still frequently find myself wrestling with it and not getting small details to line up. Not that small details always line up with MAP_SET... I'm writing today about two specific problems.

=====

1) I have 3 vectors (lat, lon, data) that I would like to map. Specifically, I'd like to export a PNG of the data for Google Earth, which means it needs to be in /CYLINDRICAL projection, and as far as I know /ISO is not required. For Google Maps I'd need to use /MERCATOR but for now I'm just starting with Google Earth.

I thought I could do this easily with MAP_SET like so:

```
limit=[min(lat),min(lon),max(lat),max(lon)]
map_set, mean(limit[[0,2]]), mean(limit[[1,3]]), $
    limit=limit, /CYL, position=[0,0,1,1], /noborder
plots, lon, lat, data
img =tvrd()
write_png, 'bathy_for_ge.png', img
```

My logic being that since this is /CYL, ROT=0, and the center of the map is the center of the limit area, the gridlines should be evenly N/S and E/W. I can then grab the entire window, save to PNG, and use it in Google Earth with the same limits. However, my grid lines are not vertical or horizontal on the screen. Almost, but not quite.

So I think maybe map_proj_* can help, but I'm having trouble getting them to work. My first attempt so far is this:

```
proj = map_proj_init( 'Equirectangular', $
    limit=limit, $
    ;; sphere_radius =
    ;; center_longitude=mean(limit[[1,3]]), $
    ;;true_scale_latitude, false_easting,
false_northing
    ;;center_latitude=mean(limit[[0,2]]), $
    _EXTRA=e)
result = map_proj_forward( lon, lat, map_structure=proj )
```

But "result" doesn't make sense to me, I'm not sure what to do with it.

=====

2) I have MODIS images with the following attributes:

Projection: Polar Stereographic

Datum: WGS84

Standard Parallel: -70.0

Corner Coordinates:

UL: 71.998860S 113.594373W

LL: 75.491196S 117.004071W

UR: 72.492200S 98.868027W

LR: 76.115095S 98.568614W

Number of Rows (MODIS): 1600

Number of Columns (MODIS): 2000

Number of Rows (AVHRR): 800

Number of Columns (AVHRR): 1000

Meters per Pixel (MODIS): 250

Meters per Pixel (AVHRR): 500

Google Earth 5.x now supports defining the corners of an image overlay, not just the edges. Still, it does not line up, presumably because this is Polar Stereographic and Google Earth expects Equirectangular. My attempts to warp this using `map_proj_*` got nowhere. I've successfully warped a similar image when the 4 middle-of-edge points were defined, along with a scale of 250 m/pixel.

I can post the code I've used to try to get this working, but it is so clearly incorrect it might waste your time to read it. I'm sure MODIS is popular on this group. Any help you can provide will be much appreciated.

Thanks,

-k.

Subject: Re: `map_proj_*` help

Posted by [David Fanning](#) on Fri, 12 Jun 2009 15:47:38 GMT

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David Fanning writes:

> OK, I guess I am giving up on this as a lost cause. I
> have tried enough variations now that I am absolutely

> convinced it is NOT possible to navigate this image
> with the information provided. The numbers don't make
> sense.

I can get closer if I navigate the GeoTiff image you
can download from the same place, but I still can't
line my grid up with the illustration on the web page:

```
,*****
,
file = 'G:\data\pine_2009084_1545_modis_ch02.tif'
image = Read_Tiff(file, Geo=geotag)
image = ByteScl(Reverse(image,2))

; Display map in window.
pos = [0.1, 0.1, 0.9, 0.9]
TVImage, image, POSITION=pos, /KEEP_ASPECT, /NOINTERP, /ERASE

; Set up Map Projection. Polar Stereographic, WGS-84 Datum.
map = Map_Proj_Init(106, DATUM=8, CENTER_LAT=-90, CENTER_LON=-70)

s = Size(image, /Dimensions)

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]

Plot, [xorigin, xend], [yorigin, yend], $
      XStyle=5, YStyle=5, /NoData, POSITION=pos, /NOERASE

; Draw map grids.
Map_Grid, MAP_STRUCTURE=map, LONDEL=5, LATDEL=1, $
      LATLAB=-105, LONLAB=-72, /LABEL
END
,*****
,
```

I do notice in the output from listgeo that there is the following
tag in the file:

ProjStraightVertPoleLongGeoKey (Double 1): -100

I wonder if this has something to do with the problem. If so,
there is nothing I can do about it in IDL. :-(

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: map_proj_* help

Posted by [David Fanning](#) on Fri, 12 Jun 2009 18:16:50 GMT

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David Fanning writes:

> I can get closer if I navigate the GeoTiff image you
> can download from the same place, but I still can't
> line my grid up with the illustration on the web page:

Actually, this only **looks** better. In fact, it is
much, much worse!

I've come to the tentative conclusion that it is NOT
possible to navigate this image with IDL map projections.
I do note that ENVI (which uses its own map projection
software) **is** able to navigate the image correctly.

This is MOST disconcerting. But not, unfortunately,
all that surprising to me. I could still be wrong
(I **hope** I am), but the current seems to be running
in the other direction. :-(

Cheers,

David

P.S. I'll buy the beer for anyone who can successfully
set up a map coordinate system in IDL for this image:

ftp://sidads.colorado.edu/pub/DATASETS/ICESHELVES/pine/pine_2009084_1545_modis_ch02.tif

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Subject: Re: map_proj_* help
Posted by [mankoff](#) on Fri, 12 Jun 2009 18:28:08 GMT
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On Jun 12, 10:29 am, David Fanning <n...@dfanning.com> wrote:

> Ken Mankoff writes:
>> Images from the NSIDC.
>
>> http://nsidc.org/data/iceshelves_images/pine.html
>
> OK, I guess I am giving up on this as a lost cause. I
> have tried enough variations now that I am absolutely
> convinced it is NOT possible to navigate this image
> with the information provided. The numbers don't make
> sense.

I haven't given up yet but I'm running out of fuel for this one. I've emailed NSIDC and will see what they reply and will update this thread if anything happens.

Thanks for trying so hard on this one David. I'm sure you'll crack it open either as soon as you really give up and not just claim to, or they provide the correct numbers.

-k.

Subject: Re: map_proj_* help
Posted by [Bruce Bowler](#) on Fri, 12 Jun 2009 18:43:45 GMT
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On Fri, 12 Jun 2009 12:16:50 -0600, David Fanning wrote:

> David Fanning writes:
>
>> I can get closer if I navigate the GeoTiff image you can download from
>> the same place, but I still can't line my grid up with the illustration
>> on the web page:
>
> Actually, this only *looks* better. In fact, it is much, much worse!
>
> I've come to the tentative conclusion that it is NOT possible to
> navigate this image with IDL map projections. I do note that ENVI (which

> uses its own map projection software) *is* able to navigate the image
> correctly.
>
> This is MOST disconcerting. But not, unfortunately, all that surprising
> to me. I could still be wrong (I *hope* I am), but the current seems to
> be running in the other direction. :-(
>
> Cheers,
>
> David
>
> P.S. I'll buy the beer for anyone who can successfully set up a map
> coordinate system in IDL for this image:
>
> ftp://sidads.colorado.edu/pub/DATASETS/ICESHELVES/pine/pine_2009084_
> 1545_modis_ch02.tif

Bear in mind that I work primarily with modis ocean data, not land data
so the following may be completely irrelevant.

position to the 6th decimal place is claiming accuracy of less than 4
inches. The smallest pixel size that I'm aware of (this is where the
"oceans" bit comes in) is 250 meters (well, OK, looking at it, it applies
to this image as well).

Given that, I wouldn't, for half a heart beat, believe their coordinates.

Bruce

PS - Let's just say I understand the mapping system even less than David
so I ain't gonna try for the free beer

Subject: Re: map_proj_* help
Posted by [Bruce Bowler](#) on Fri, 12 Jun 2009 18:48:55 GMT
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On Fri, 12 Jun 2009 18:43:45 +0000, I wrote:

> position to the 6th decimal place is claiming accuracy of less than 4
> inches. The smallest pixel size that I'm aware of (this is where the

My bad, make that slightly more than 4 inches (4.3748031496 to be
precise :-)

Bruce

Subject: Re: map_proj_* help
Posted by [David Fanning](#) on Fri, 12 Jun 2009 18:51:11 GMT
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Ken Mankoff writes:

- > Thanks for trying so hard on this one David. I'm sure you'll crack it
- > open either as soon as you really give up and not just claim to, or
- > they provide the correct numbers.

This is one of my very biggest weaknesses. I need to learn to move on in the face of insurmountable technical hurdles. :-(

Partly, I think, I am just reluctant to admit that IDL--my life for the last 20 years--is becoming increasingly irrelevant to me. Geez, if I can't do map projections with it, what's the point?

For what it's worth, I do think the numbers are correct. I just don't think it is possible to set up this map projection in IDL. I'm certainly to the point now where I would be willing to bet some money on it. :-)

Cheers,

David

--

David Fanning, Ph.D.
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Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: map_proj_* help
Posted by [David Fanning](#) on Fri, 12 Jun 2009 19:32:39 GMT
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David Fanning writes:

- > I've come to the tentative conclusion that it is NOT
- > possible to navigate this image with IDL map projections.
- > I do note that ENVI (which uses its own map projection
- > software) *is* able to navigate the image correctly.
- >
- > This is MOST disconcerting. But not, unfortunately,
- > all that surprising to me. I could still be wrong

> (I *hope* I am), but the current seems to be running
> in the other direction. :-(

Oh, never mind. I figured it out. :-(

Here you go. The good news is I probably got another
web page article out of it. :-)

```
.*****  
,  
file = 'G:\data\pine_2009084_1545_modis_ch02.tif'  
image = Read_Tiff(file, Geo=geotag)  
image = BytScl(Reverse(image,2))  
  
; Display map in window.  
pos = [0.1, 0.1, 0.9, 0.9]  
TVImage, image, POSITION=pos, /KEEP_ASPECT, /NOINTERP, /ERASE  
  
; Set up Map Projection. Polar Stereographic, WGS-84 Datum.  
map = Map_Proj_Init(106, DATUM=8, CENTER_LAT=-70, CENTER_LON=-100)  
  
; Set the limits of the image.  
s = Size(image, /Dimensions)  
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]  
  
; Set up the map coordinate space.  
Plot, [xorigin, xend], [yorigin, yend], $  
    XStyle=5, YStyle=5, /NoData, POSITION=pos, /NOERASE  
  
; Draw map grids.  
Map_Grid, MAP_STRUCTURE=map, LONDEL=5, LATDEL=1, $  
    LATLAB=-110, LONLAB=-75, /LABEL  
.*****  
,
```

Didn't I tell you we would probably have it whipped by Friday!
This is pretty much how map projections go. At least for me.

Cheers,

David

--

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Subject: Re: map_proj_* help
Posted by [David Fanning](#) on Fri, 12 Jun 2009 19:40:19 GMT
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David Fanning writes:

> Oh, never mind. I figured it out. :-(

I probably should tell you how I solved this, although
God knows I could probably get rich if I kept it to
myself. Goes against my nature though, and, anyway,
I'm storing up karma for the next life. Maybe I can
be a Matlab expert. ;-)

What I did was I opened the TIFF file in Frank
Warmerdam's FW_TOOLS application and I looked to see
how he was interpreting the GeoTIFF structure.
If I hadn't insisted on IDL all the damn day, I
probably could have figured it out a bit sooner. :-(

Cheers,

David

--

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Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: map_proj_* help
Posted by [David Fanning](#) on Fri, 12 Jun 2009 19:49:58 GMT
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David Fanning writes:

> I probably should tell you how I solved this, although

- > God knows I could probably get rich if I kept it to
- > myself. Goes against my nature though, and, anyway,
- > I'm storing up karma for the next life. Maybe I can
- > be a Matlab expert. ;-)

By the way, if this kind of detective work appeals to the younger programmers lurking about, I HIGHLY recommend you go get the book Desert Notes/River Notes by Barry Lopez and read the story Directions. That is what it is *always* about with me!

<http://tinyurl.com/n23xbb>

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: map_proj_* help

Posted by [mankoff](#) on Fri, 12 Jun 2009 20:03:15 GMT

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On Jun 12, 2:16 pm, David Fanning <n...@dfanning.com> wrote:

- > P.S. I'll buy the beer for anyone who can successfully
- > set up a map coordinate system in IDL for this image:

I'll be driving from NYC to Santa Cruz to begin my new life as a PhD student soon. Maybe I'll hit Fort Collins on the way and buy you that beer you rather than have you buy it for yourself.

-k.

Subject: Re: map_proj_* help

Posted by [David Fanning](#) on Fri, 12 Jun 2009 20:09:22 GMT

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Ken Mankoff writes:

- > I'll be driving from NYC to Santa Cruz to begin my new life as a PhD
- > student soon. Maybe I'll hit Fort Collins on the way and buy you that

> beer you rather than have you buy it for yourself.

Too late. I already talked Coyote into opening the FAC early. :-)

Cheers,

David

P.S. Please do. Always happy to learn what my friends look like in person.

--

David Fanning, Ph.D.

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Subject: Re: map_proj_* help

Posted by [R.G. Stockwell](#) on Fri, 12 Jun 2009 20:38:13 GMT

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"Bruce Bowler" <bbowler@bigelow.org> wrote in message
news:79fm8nF1q8fprU2@mid.individual.net...

> On Fri, 12 Jun 2009 18:43:45 +0000, I wrote:

>

>> position to the 6th decimal place is claiming accuracy of less than 4
>> inches. The smallest pixel size that I'm aware of (this is where the

>

> My bad, make that slightly more than 4 inches (4.3748031496 to be
> precise :-)

This precision problem is apparent in google earth as well.

During a google earth conference, I pointed out that the number of decimal points shown in google earth implied resolution on the order of a centimeter. Therefore they could distinguish one side of my laptop from the other. And that is when the entire earth is in view (and hence the crosshairs with which the user selects co-ordinates are drawn to be probably 100 km wide, in that view).

My point fell on deaf ears though. Bunch of comp sci people apparently. If there were more physicists there, surely their heads would have exploded.

cheers,

bob

PS "Sig dig!!" in red ink

Subject: Re: map_proj_* help

Posted by [David Fanning](#) on Sat, 13 Jun 2009 21:09:54 GMT

[View Forum Message](#) <> [Reply to Message](#)

David Fanning writes:

> Oh, never mind. I figured it out. :-(
>
> Here you go. The good news is I probably got another
> web page article out of it. :-)

OK, I've written this up for general consumption. (Left all the requisite swear words and references to the Dalai Lama out of it.)

As always (probably the main reason I write these articles) I learned even more about the problem as I wrote it down. Anyway, the article shows you how to navigate both the GeoTiff and the PNG version of this image. They have to be done in slightly different ways due to unspoken "conventions".

You can find the article here:

http://www.dfanning.com/map_tips/iceshelf.html

Cheers,

David

P.S. Oh, if you are going to run the code, get a fresh copy of the Catalyst Library. Things **always** change when you probe below the surface of things. ;-)

--

David Fanning, Ph.D.

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Subject: Re: map_proj_* help

David Fanning writes:

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- > image. They have to be done in slightly different ways
- > due to unspoken "conventions".
- >
- > You can find the article here:
- >
- > http://www.dfanning.com/map_tips/iceshelf.html

Just to wrap this whole sorted tale up, I have asked the good folks at NSIDC to please add the latitude which is down from the map origin to the information provided on their map image page. Without this piece of information, it would be nearly impossible to navigate the image successfully.

And I wanted to point out that IDL itself is a bit confusing in this regard, in that the CENTER_LATITUDE keyword, which normally identifies the latitude of the map origin (at least it does in every map projection I have ever worked with) does no such thing with polar stereographic map projections. Instead, this keyword identifies the true-scale latitude or standard latitude (the terms are often used interchangeably). I've added a bit more detail on this state of affairs in this article:

http://www.dfanning.com/map_tips/polarstereo.html

Cheers,

David

--

David Fanning, Ph.D.
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