
Subject: Re: map_set stereographic projection
Posted by [David Fanning](#) on Thu, 27 Apr 2006 14:23:21 GMT
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dvila writes:

> I'm trying to deal with a pre-projected polar stereographic image with
> this geometrical characteristics:
>
> # It is a 1121x881 polar stereographic grid.
> # Point (1,1) is at 23.117N 119.023W.
> # Point (1,881) is at 53.509N 134.039W.
> # Point (1121,1) is at 19.805N 80.750W.
> # Point (1121,881) is at 45.619N 59.959W.
> # The y-axis is parallel to 105W.
> # The resolution is 4.7625km at 60N.
> # The pole point is (I,J) = (400.5,1600.5)
>
> I don't know how may I set the map_set routine to fit the map with the
> data. Is it possible to work with pre-projected data?

On occasion. See, for example:

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

> On the other hand, can I change the projection to a regular lat-lon
> grid in IDL?

Probably not. :-)

I don't know the definitive answers to these questions, but
I have a reason to find out. Where can I find one of these
images you are trying to fit a map projection to?

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: map_set stereographic projection
Posted by [dvila](#) on Thu, 27 Apr 2006 18:51:22 GMT
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David,

Certainly I started with that link but I couldn't deal with the limit keyword on map_set routine because the four corners of the image have different latitude and longitude (due to the projection, I supposed). Otherwise, I have all other data (to compare with these ones) in a lat-lon regular grid projection...

You can find an image in

<http://essic.umd.edu/~dvila/ftp/>

It's daily precipitation data (in mm) with 9.999E20 as missing data. Thanks again!

Daniel

David Fanning wrote:

> dvila writes:

>

>> I'm trying to deal with a pre-projected polar stereographic image with this geometrical characteristics:

>>

>> # It is a 1121x881 polar stereographic grid.

>> # Point (1,1) is at 23.117N 119.023W.

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> On occasion. See, for example:

>

> http://www.dfanning.com/map_tips/georeference.html

>

>> On the other hand, can I change the projection to a regular lat-lon grid in IDL?

>

> Probably not. :-)

>

> I don't know the definitive answers to these questions, but

> I have a reason to find out. Where can I find one of these

> images you are trying to fit a map projection to?

>

> Cheers,

>

> David
> --
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: map_set stereographic projection
Posted by [David Fanning](#) on Thu, 27 Apr 2006 19:14:55 GMT
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dvila writes:

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> keyword on map_set routine because the four corners of the image have
> different latitude and longitude (due to the projection, I supposed).
> Otherwise, I have all other data (to compare with these ones) in a
> lat-lon regular grid projection...
>
> You can find an image in
>
> <http://essic.umd.edu/~dvila/ftp/>
>
> It's daily precipitation data (in mm) with 9.999E20 as missing data.

Do you have some IDL code that reads this file? :-)

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
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Subject: Re: map_set stereographic projection
Posted by [dvila](#) on Thu, 27 Apr 2006 19:29:45 GMT
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David,

A little piece of code is in the same place
Thanks!

Daniel

David Fanning wrote:

> dvila writes:
>
>> Certainly I started with that link but I couldn't deal with the limit
>> keyword on map_set routine because the four corners of the image have
>> different latitude and longitude (due to the projection, I supposed).
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> Do you have some IDL code that reads this file? :-)
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> Cheers,
>
> David
>
> --
> David Fanning, Ph.D.
> Fanning Software Consulting, Inc.
> Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: map_set stereographic projection

Posted by peter.albert@gmx.de on Fri, 28 Apr 2006 08:33:21 GMT

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Hi Daniel,

I found it often useful to use the 8-element limit keyword with map_set. You are not restricted to the corners of the mapped region then and have more freedom to choose the "anchor points". Moreover, sometimes the corners aren't actually on earth, in those cases you must use the 8-element vector. It's a bit tricky to get used to, but it's worth trying. Basically, you are specifying 4 points (as lat/lon pairs) anywhere on the left, upper, right and lower boundary of the area. "Anywhere, how's that supposed to work?" Well, it just does. Funny enough.

But then this is probably not the right way for your problem, as you'd like to get the regular lat-lon projection. What you actually need are the lon/lat values for each pixel. With those, you can either project your data in any projection (using e.g. Liam Gumleys `IMAGEMAP()` routine

or our MAP_IMAGE__DEFINE object found at <http://wew.met.fu-berlin.de/idl>).

If you actually want to transform the data itself into regular lon / lat grid, e.g. for pixelwise comparison with other datasets, you might want to use LONLAT2REG(), found on the same website. This routine averages irregularly gridded lon / lat data into any regular lon / lat array.

But now, how do you get the lon/lat values for each pixel?

First try: Ask the data provider. They should have the data. Somewhere.
Second try: Download the "proj" software and calculate them yourself. (<http://proj.maptools.org/>). proj is not easy to get started with, but if you have to do map transformations more than once (including, possibly, different ellipsoids), it's well worth every minute spent reading the manual.

I would recommend calculating all map coordinates in map space first (i.e. coordinates being given in x = meters east of greenwich meridian; y = meters from the equator) and use proj to transform those into lat/lon. I have to admit that I only had to deal with sinusoidal projection so far, which was pretty easy, and do not know how to actually approach polar stereographic. But in case you don't get the lat/lon data from the data providers, I would recommend to give proj a good try. And the proj people have a quite helpful mailing list, too...

Best regards,

Peter

Subject: Re: map_set stereographic projection
Posted by [dvila](#) on Fri, 28 Apr 2006 11:23:44 GMT
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Thank you, Peter. The data provider offers a little Fortran program to calculate the lat, lon of each pixel, so it's very easy to perform an array with the lat,lon of each point of the data array. I'll download the routines to know which are the input data and the data format. Thanks!!

Daniel

Peter Albert wrote:

> Hi Daniel,
>

> I found it often useful to use the 8-element limit keyword with
> `map_set`. You are not restricted to the corners of the mapped region then
> and have more freedom to choose the "anchor points". Moreover,
> sometimes the corners aren't actually on earth, in those cases you
> `_must_` use the 8-element vector. It's a bit tricky to get used to, but
> it's worth trying. Basically, you are specifying 4 points (as lat/lon
> pairs) `_anywhere_` on the left, upper, right and lower boundary of the
> area. "Anywhere, how's that supposed to work?" Well, it just does.
> Funny enough.
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> like to get the regular lat-lon projection. What you actually need are
> the lon/lat values for each pixel. With those, you can either project
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> or our `MAP_IMAGE__DEFINE` object found at
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> But now, how do you get the lon/lat values for each pixel?
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> First try: Ask the data provider. They should have the data. Somewhere.
> Second try: Download the "proj" software and calculate them yourself.
> (<http://proj.maptools.org/>). `proj` is `_not_` easy to get started with,
> but if you have to do map transformations more than once (including,
> possibly, different ellipsoids), it's well worth every minute spent
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> I would recommend calculating all map coordinates in map space first
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> lat/lon. I have to admit that I only had to deal with sinusoidal
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> actually approach polar stereographic. But in case you don't get the
> lat/lon data from the data providers, I would recommend to give `proj` a
> good try. And the `proj` people have a quite helpful mailing list, too...
>
>
> Best regards,
>
> Peter

Subject: Re: map_set stereographic projection
Posted by peter.albert@gmx.de on Fri, 28 Apr 2006 12:08:54 GMT
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Sounds good. Good luck :-)

Peter

Subject: Re: map_set stereographic projection
Posted by [David Fanning](#) on Fri, 28 Apr 2006 13:35:35 GMT
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Peter Albert writes:

- > But then this is probably not the right way for your problem, as you'd
- > like to get the regular lat-lon projection. What you actually need are
- > the lon/lat values for each pixel. With those, you can either project
- > your data in any projection (using e.g. Liam Gumleys `IMAGEMAP()` routine
- > or our `MAP_IMAGE__DEFINE` object found at
- > <http://wew.met.fu-berlin.de/idl>).

I like this `MAP_IMAGE__DEFINE`, but there are an awful lot of `!QUIET=0` calls in the example code. What's that all about!? :-)

Cheers,

David

P.S. Let's just say I'm always suspicious when the information flow gets cut off. :-)

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: map_set stereographic projection
Posted by [James Kuyper](#) on Fri, 28 Apr 2006 13:40:03 GMT
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dvila wrote:

- > Hi all,
- >
- > I'm trying to deal with a pre-projected polar stereographic image with
- > this geometrical characteristics:
- >

```

> # It is a 1121x881 polar stereographic grid.
> # Point (1,1) is at 23.117N 119.023W.
> # Point (1,881) is at 53.509N 134.039W.
> # Point (1121,1) is at 19.805N 80.750W.
> # Point (1121,881) is at 45.619N 59.959W.
> # The y-axis is parallel to 105W.
> # The resolution is 4.7625km at 60N.
> # The pole point is (I,J) = (400.5,1600.5)
>
> I don't know how may I set the map_set routine to fit the map with the
> data. Is it possible to work with pre-projected data?

```

```

stereo = MAP_PROJ_INIT('Stereographic', CENTER_LONGITUDE=-105, $
CENTER_LATITUDE=90)

```

```

; The repeat at the end will serve to close the box in oplot command
longitude = [-119.023D, -134.039, -59.959, -80.750, -119.023]
latitude = [23.117D, 53.509, 45.619, 19.8057, 23.117]
uv = MAP_PROJ_FORWARD(longitude,latitude,MAP_STRUCTURE=stereo)

```

```

; These are the u-v values corresponding to pixel centers along each
edge.

```

```

topv = (uv[1,1]+uv[1,2])*0.5
botv = (uv[1,0]+uv[1,3])*0.5
leftu = (uv[0,0]+uv[0,1])*0.5
rightu = (uv[0,2]+uv[0,3])*0.5

```

```

xscale = (rightu-leftu)/(1121-1)
yscale = (topv-botv)/(881-1)

```

```

; U-V coordinates of midpoints of outer edges

```

```

u = [leftu-0.5*xscale, 0.5*(leftu+rightu), rightu+0.5*xscale, $
0.5*(leftu+rightu)]
v = [0.5*(botv+topv), topv+0.5*yscale, 0.5*(botv+topv),
botv-0.5*yscale]
lonlat = MAP_PROJ_INVERSE(u, v, MAP_STRUCTURE=stereo)
limit = [lonlat[1,*],lonlat[0,*]]

```

```

WINDOW,XSIZE=1120,YSIZE=880

```

```

MAP_SET, 90, -105, /STEREOGRAPHIC,
LIMIT=limit,/NOBORDER,XMARGIN=0,YMARGIN=0

```

```

; To verify that we've set up the map projection correctly:

```

```

pixels = CONVERT_COORD(longitude,latitude,/DATA,/TO_DEVICE)
print,pixels

```

```

data = FLTARR(1120,880)

```

```

; Fill in data
TVSCL,data

```

MAP_GRID,/LABEL
MAP_CONTINENTS,/HIRES
; Draw closed box through corner pixels
OPLOT,longitude,latitude

Subject: Re: map_set stereographic projection
Posted by [David Fanning](#) on Fri, 28 Apr 2006 14:24:02 GMT
[View Forum Message](#) <> [Reply to Message](#)

kuyper@wizard.net writes:

```
> stereo = MAP_PROJ_INIT('Stereographic', CENTER_LONGITUDE=-105, $  
> CENTER_LATITUDE=90)  
>  
> etc.
```

Ah, *very* helpful!! I had to add a POSITION=[0,0,1,1] to your MAP_SET command, but now I have the image in the correct position with respect to the map. This whole business with the UV coordinates was *exactly* what I wanted to know about. Thanks for this!

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Subject: Re: map_set stereographic projection
Posted by [mattie](#) on Fri, 28 Apr 2006 16:58:55 GMT
[View Forum Message](#) <> [Reply to Message](#)

kuyper@wizard.net writes:

```
> dvila wrote:  
>> Hi all,  
>>  
>> I'm trying to deal with a pre-projected polar stereographic image with  
>> this geometrical characteristics:  
>>  
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```

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>> # The y-axis is parallel to 105W.
>> # The resolution is 4.7625km at 60N.
>> # The pole point is (I,J) = (400.5,1600.5)
>>
> ; These are the u-v values corresponding to pixel centers along each
> edge.
> topv = (uv[1,1]+uv[1,2])*0.5
> botv = (uv[1,0]+uv[1,3])*0.5
> leftu = (uv[0,0]+uv[0,1])*0.5
> rightu = (uv[0,2]+uv[0,3])*0.5

```

Aren't these the u-v values corresponding to the `_center_` of the gridcell along each edge? (assuming the initial data gave the centerpoints of the gridcell.)

```

>
> xscale = (rightu-leftu)/(1121-1)
> yscale = (topv-botv)/(881-1)
>
> ; U-V coordinates of midpoints of outer edges
> u = [leftu-0.5*xscale, 0.5*(leftu+rightu), rightu+0.5*xscale, $
>   0.5*(leftu+rightu)]
> v = [0.5*(botv+topv), topv+0.5*yscale, 0.5*(botv+topv),
>   botv-0.5*yscale]
> lonlat = MAP_PROJ_INVERSE(u, v, MAP_STRUCTURE=stereo)
> limit = [lonlat[1,*],lonlat[0,*]]

```

Again, I'm not sure, but don't you have to add half a gridcell to each direction to get the outer limit of each grid cell?

I'm asking these questions honestly because I've never quite convinced myself which is the actual limit of the `map_set` command. I think it's the outside edge of the grid cell that you want to set. So for this example, it will be quite close (half a pixel over 800. But if you're working with zoomed regions. 10x10 grid cells or whatever, it becomes noticeable.

But this was a very informative tutorial on how to register images when corner points are known.

Thanks
Matt

btw. Does anyone know of a free news server that will let me post (besides google)? The university just turned ours off. Thanks.

--

Matthew Savoie - Scientific Programmer
National Snow and Ice Data Center
(303) 735-0785 <http://nsidc.org>

Subject: Re: map_set stereographic projection
Posted by peter.albert@gmx.de on Tue, 02 May 2006 07:56:25 GMT
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Humm, well, I guess those !quiet=0 lines are remnants from the times when I did not know about the SILENT keyword to LOADCT and at some point did not want to read those messages any more ... :-) I have to admit that I completely left IDL programming last December, but a very quick check on my old PC seems to show that no real message gets suppressed. I'll see whether I can delete those lines on the web page.

Cheers,

Peter
