Subject: Re: IDL projections (MAP_PROJ_IMAGE) and ENVI projections, Select spatial substets of images
Posted by sh on Mon, 07 Jun 2010 08:50:55 GMT
View Forum Message <> Reply to Message

On Jun 6, 7:32 pm, David Fanning <n...@dfanning.com> wrote:
> Sebastian writes:
>> I have a problem using map projections since I didn't get the same
>> results for IDL and ENVI.
>
>> My task is to reproject an image in lat/lon's (WGS 84, Geographic lat
>> lon) to mercator for Australia and show/save (*.png) only spatial
>> defined subsets of this reprojected image. (And also define "bigger"
>> spatial subset and pin the image on the right position)
>
>> I tested MAP_IMAGE and MAP_PROJ_IMAGE in IDL, but in both cases a had
>> a problem with the output dimension. MAP_IMAGE seems to act in
>> accordance with the predefined windows size and with MAP_PROJ_IMAGE it
>> is possible to set it by yourself. On the contrary, ENVI makes a
>> suggestion concerning the output pixelsize, but I didn't get it how
>> ENVI calculates this output size.
>> So I guess the sampling rate and/or pixel size is responsible for the
>> suggetion of ENVI?? Or even the distortion introduced by the map
>> projection??
>
> To transform one map projection into another you have
> to put all the pixel information into XY coordinates
> (sometimes called UV coordinates in IDL). In other
> words, you have to do this in projected coordinate
> space, not geographic coordinate (lat/lon) space.
> The pixel resolution you are refering to is the pixel
> spacing in this projected coordinate space. Or, another
> way of saying this, the projected grid spacing. The
> output resolution of the image is how many grid units
> you want to have in your final image.
>
> To do this gridding, you create a projected grid and for
> every grid unit, you find the latitude and longitude
> of that point (Map_Proj_Inverse). Then, you calculate
> a new value by interpolating that point from your original
> image values. This is basically what Map_Proj_Image does
> for you.
>
>> Anyway, for my further comparison between ENVI and IDL I used the
>> output dimension suggested by ENVI to reproject the image. And to
>> compare the results I made to plots with the coast lines, which in
>> BOTH (!) cases didn't match (the result of ENVI was a little bit
>> better somehow)

>
> Humm. Don't know about this. I've never had trouble putting
> map boundaries on images, if I have set up the map coordinate
> space in the correct way. Mostly this means setting up a
> projected grid range (rectangular array) so that I can "plot"
> the map boundaries on it. I use the MapCoord object in my
> Catalyst Library to do this. It always does a good job for
> the map projections I use. (I use the Map_Outline object to
> draw the map boundaries and the Map_Grid object to draw map
> grids.)
>
>> Now I have several questions/comments:
>
>> - I have seen that there are 2 libraries within IDL (IDL, GCTP), so I
>> tested both of them. The only difference I realized was that you can't
>> set an ellipsoid for the IDL (map_set) library. Which library uses
>> ENVI??
>
> Neither. :-)
>
> At the time ENVI was written IDL only had the Map_Set map
> projections. There were (and still are!) completely inadequate
> for the kind of precision ENVI wanted, so the ENVI folks wrote
> their own map projection software, which I presume they still
> use.
>
> Later, IDL added the GCTP map projections and these are
> much better (and the only ones you should be using if you
> want professional map projections), but there have always
> been problems with them (several of which are *finally*
> fixed in the upcoming IDL 8) and they are also becoming
> a bit long of tooth. Better open source map projections
> exist (proj4 routines) and, in my mind, should be incorporated
> into IDL if the folks at ITTVIS want to be current with
> what's going on in this field.
>
>> - I use congrid to resize the image to a "plotable" size. Maybe this
>> causes the shifting between the coastlines?
>
> Well, I guess it depends on how you are using it. :-)
>
> I always use TVImage to display my images, and it uses
> Congrid, of course. As I say, I've never had problems
> aligning boundaries on images.
>
>> - How can I select a spatial subset from the image and plot it into a
>> "bigger" spatial subset? e.g. to show only the east coast of australia
>> but with new zealand (where no image data is available) I think the

>> "problem" here is to find the right position?
>
> This is really just a gridding problem. One of the
> weaknesses of IDL is that it doesn't really allow
> the kind of map image gridding you need for working
> with images in map projections. (I say this with
> some trepidation because I am convinced that IDL
> probably *does* provide this kind of support, but
> in five or six years of trying to use IDL to do it,
> I have come up completely empty.) At NSIDC, this
> kind of gridding is done with our mapx utilities,
> which are only available on UNIX platforms.
>
> In any case, it is probably not too difficult to
> produce the kind of output you want, if you set your
> "data" coordinate space up correctly. Again, I would
> rely on my MapCoord object to do this.
>
>> some lines of my code:
>
>> ; to display IDL result
>
>> geographical_extend= [-39.5,112.5,-10.5,154.0]
>> range =
>> [geographical_extend[1],geographical_extend[0],geographical_
extend[3],geographical_extend[2]]
>
>> ; c is the image with the size 9960, 6960 and pixelspacing 0.00417°
>> map4 = map_proj_init(105, ellipsoid=8, limit=geographical_extend)
>> warped4 = map_proj_image(c, range, dimensions=[10983,7797],
>> map_structure=map4, uvrange=uvOut4, xindex=xindex4, yindex=yindex4)
>
> To do this correctly, the "range" should not be in
> geographical coordinates, but in projected XY coordinates.
> Earlier documentation (i.e., prior to IDL 7.1) of
> Map_Proj_Image was misleading on this point.
>
> I gave a talk on IDL map projections at the last IDL
> Users Group meeting which you may find helpful. You can
> find my Powerpoint presentation here:
>
> http://www.dfanning.com/powerpoint/map_projections_idl.pdf
>
> 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.")

Thanks a lot David for your detailed answer!

I already saw your example of how to warpe images, but this only shows how to project already projected images. And my image is "raw" lat,lon.

Anyway, at least I found a (very old) program which does and can exactly what I want. Maybe someone could take a look, if the results are correct!? Or where is room for improvement?!

http://cimss.ssec.wisc.edu/~gumley/imagemap.html
http://cimss.ssec.wisc.edu/~gumley/idl/imagemap.pro

thx!

Subject: Re: IDL projections (MAP_PROJ_IMAGE) and ENVI projections, Select spatial substets of images
Posted by David Fanning on Mon, 07 Jun 2010 11:59:04 GMT
View Forum Message <> Reply to Message

sh writes:

> I already saw your example of how to warpe images, but this only shows
> how to project already projected images. And my image is "raw"
> lat,lon.

I'm not sure what "raw" means. But these are probably just geographic coordinates. This is sometimes called a plate carree map projection, or--in GCTP parlance--an equirectagular projection.
>
> Anyway, at least I found a (very old) program which does and can
> exactly what I want. Maybe someone could take a look, if the results
> are correct!? Or where is room for improvement?!

"Correct" in what sense? It is certainly not the kind of projected data you can do science with, as Liam points out in his notes. It is a "display" solution. In this sense, if it "looks good" it is probably correct enough.

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: IDL projections (MAP_PROJ_IMAGE) and ENVI projections, Select spatial substets of images
Posted by d.poreh on Mon, 07 Jun 2010 12:06:37 GMT
View Forum Message <> Reply to Message

On Jun 7, 4:59 am, David Fanning <n...@dfanning.com> wrote:
> sh writes:
>> I already saw your example of how to warpe images, but this only shows
>> how to project already projected images. And my image is "raw"
>> lat,lon.
>
> I'm not sure what "raw" means. But these are
> probably just geographic coordinates. This is
> sometimes called a plate carree map projection,
> or--in GCTP parlance--an equirectagular projection.
>
>
>
>> Anyway, at least I found a (very old) program which does and can
>> exactly what I want. Maybe someone could take a look, if the results
>> are correct!? Or where is room for improvement?!
>
> "Correct" in what sense? It is certainly not the
> kind of projected data you can do science with, as
> Liam points out in his notes. It is a "display"
> solution. In this sense, if it "looks good" it is
> probably correct enough.
>
> 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.")

As Liam point out, this routine is not working for high latitudes
(weird) too!!!

Subject: Re: IDL projections (MAP_PROJ_IMAGE) and ENVI projections, Select spatial substets of images
Posted by sh on Tue, 08 Jun 2010 13:13:17 GMT
View Forum Message <> Reply to Message

On Jun 7, 2:06 pm, Dave Poreh <d.po...@gmail.com> wrote:
> On Jun 7, 4:59 am, David Fanning <n...@dfanning.com> wrote:
>
>
>
>> sh writes:
>>> I already saw your example of how to warpe images, but this only shows
>>> how to project already projected images. And my image is "raw"
>>> lat,lon.
>
>> I'm not sure what "raw" means. But these are
>> probably just geographic coordinates. This is
>> sometimes called a plate carree map projection,
>> or--in GCTP parlance--an equirectagular projection.
>
>>> Anyway, at least I found a (very old) program which does and can
>>> exactly what I want. Maybe someone could take a look, if the results
>>> are correct!? Or where is room for improvement?!
>
>> "Correct" in what sense? It is certainly not the
>> kind of projected data you can do science with, as
>> Liam points out in his notes. It is a "display"
>> solution. In this sense, if it "looks good" it is
>> probably correct enough.
>
>> 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.")
>
> As Liam point out, this routine is not working for high latitudes
> (weird) too!!!

Finally it works like your example on your webpage David. (http://www.dfanning.com/map_tips/warpimage.html)

The image was flipped horizontally and I just changed this at TV not before I'm reprojecting the image!!
Stupid mistake!

Subject: Re: IDL projections (MAP_PROJ_IMAGE) and ENVI projections, Select spatial substets of images
Posted by David Fanning on Tue, 08 Jun 2010 13:20:12 GMT
View Forum Message <> Reply to Message

sh writes:

> The image was flipped horizontally and I just changed this at TV not
> before I'm reprojecting the image!!

Ah, yes. Flipping images (I always use REVERSE rather than !ORDER or absolute chaos ensues) is just something I've learned to do always. I don't even think about it any more, and often forget I have done it. Mapping *always* means the (0,0) location is in the upper-left corner. This is just something you have to memorize in IDL, like COLUMN-row.

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.")
