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
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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!