
Subject: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Fri, 15 Dec 2006 15:42:02 GMT
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Folks,

Does anyone have any experience working with AVHRR NDVI image data or Albers map projection? I have obtained the data, which is of the African continent from here:

<ftp://ftp.glcfc.umd.edu/glcfc/GIMMS/Regional/Albers/Africa>

The image is in an Albers Conical equal area projection and the centers of the four corner pixels are known from the documentation:

; YX coordinates of the four corners (LL, UL, UR, LR)
longitude = [-23.49, -24.6, 64.523, 63.414]
latitude = [-42.243, 43.711, 43.712, -42.242]

This is a GeoTiff file, so I also pull the Standard Parallels out of the geotiff information stored in the file (they are -19 and 21).

I follow the method outlined on this page (which has worked perfectly for a polar stereo map projection), using instead of a Stereo projection, an Albers projection with standard parallels:

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

The method *ALMOST* works! :-)

But the continental outlines do not QUITE line up properly. You can see my result here:

<http://www.dfanning.com/misc/africa.jpg>

Do you think this might be an Albers projection problem? A difference between MAP_PROJ_INIT and MAP_SET? (I have tried different DATUMS with no change in effect.)

Or, do you think this might just be right? :-)

Cheers,

David

P.S. Don't worry about the colors. They are still screwed up.

--

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: AVHRR Image Mapping Problem

Posted by [David Fanning](#) on Fri, 15 Dec 2006 18:50:10 GMT

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kuyper@wizard.net writes:

> Actually, yes. I have no idea why the standard parallels might be
> incorrect, but given the symptoms you describe, it might be worthwhile
> to try 19.99999 and -20.00001. IDL doesn't like it when the standard
> parallels add up to exactly zero. That is unfortunate, because a Albers
> projection with standard parallels adding up to zero is a different way
> of describing the cylindrical equal-area projection, one of my favorite
> map projections, and one that IDL doesn't support.

Here are the results. Possibly a bit better.

Here are the results with parallels at "normal"
-19 and 21.

<http://www.dfanning/misc/normal.png>

Here are the results with parallels at -19.9999 and 20.0001.

<http://www.dfanning/misc/kuyper.png>

The results using parallels of 19.9999 and -20.001 are identical to that above. As are the results if I switch the values for STANDARD_PAR1 and STANDARD_PAR2.

If you load these in your browser and hit your back and forward buttons, you can see a little movie of these projections switching back and forth. Don't know what that shows, but it distracts me from the real problem. :-)

Cheers,

David

--

David Fanning, Ph.D.

Subject: Re: AVHRR Image Mapping Problem
Posted by [Matt\[1\]](#) on Fri, 15 Dec 2006 19:21:08 GMT
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There is no right and wrong standard parallels. The standard parallels are lines along which the distortion of the map projection is the smallest, getting progressively larger as you move away from the lines. Thus, you can change your standard parallels to ANYTHING you want, depending on many factors, mainly, which area on the Earth's surface you want to study.

So, by changing the stadard parallels all you are doing is telling your projection engine (or whatever it's called) to center on a different part of the globe/map. Your vector data is not reading these standard parallel parameters in the same way as the raster data, becasue if it was, it would be changing along with your raster data. My veredict is that you have too many data types/parameters for the software to deal with accurately:

Raster data in Albers centered on Africa
Vector data for the world in some other projection, probably centered on the prime meridian

If you get all this data to a single format (extent of African continent only - not the world, both datasets in Albers with same std parallels), this this could resolve the misalignment...

Matt

On Dec 15, 1:50 pm, David Fanning <n...@dfanning.com> wrote:

> kuy...@wizard.net writes:

>> Actually, yes. I have no idea why the standard parrallels might be
>> incorrect, but given the symptoms you describe, it might be worthwhile
>> to try 19.99999 and -20.00001. IDL doesn't like it when the standard
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> David
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> David Fanning, Ph.D.
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> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: AVHRR Image Mapping Problem
Posted by [Bob\[3\]](#) on Fri, 15 Dec 2006 19:21:20 GMT
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On Dec 15, 1:50 pm, David Fanning <n...@dfanning.com> wrote:
> Here are the results. Possibly a bit better.

That appears to be largely dependent on your area of interest (check Madagascar ;))

Could the precision of the four corners have a similar (tho hopefully 'better') effect?

Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Fri, 15 Dec 2006 19:33:29 GMT
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Matt writes:

> Raster data in Albers centered on Africa
> Vector data for the world in some other projection, probably centered

- > on the prime meridian
- >
- > If you get all this data to a single format (extent of African
- > continent only - not the world, both datasets in Albers with same std
- > parallels), this this could resolve the misalignment...

Well, you have identified my problem in a nutshell! :-)

The real question for me and my client is this: can it be done in IDL? Any thoughts on that?

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: AVHRR Image Mapping Problem
Posted by [Matt\[1\]](#) on Fri, 15 Dec 2006 20:07:42 GMT
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Not sure. I use the IDL+ENVI package, which may or may not be able to handle it. I say this because I have never tried doing anything with vector data but the most basic operations in ENVI. Seeing that it's an image analysis program, I would be surprised if it's vector capabilities are very robust. Conversely, if you had ArcGIS you could probably convert your vector data to your required format in 5 minutes.

You could work the problem from the opposite angle, meaning that you could try and adjust the image to fit the projection of the vector data. Can you warp the image to the projection of your country outline (is it geographic)? This is done in envi using `envi_convert_projection_coordinates`, which converts coordinates from one projection to another. I don't know if this is available as another function in stand-alone IDL.

Also, keep in mind that geographic coordinates are no good if you are trying to measure areas or distances. So converting to geographic may not be useful if you are trying to quantify rather than visualize.

Matt

On Dec 15, 2:33 pm, David Fanning <n...@dfanning.com> wrote:

> Matt writes:

>> Raster data in Albers centered on Africa

>> Vector data for the world in some other projection, probably centered

>> on the prime meridian

>

>> If you get all this data to a single format (extent of African

>> continent only - not the world, both datasets in Albers with same std

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Subject: Re: AVHRR Image Mapping Problem

Posted by [David Fanning](#) on Fri, 15 Dec 2006 20:33:15 GMT

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Matt writes:

> Not sure. I use the IDL+ENVI package, which may or may not be able to

> handle it. I say this because I have never tried doing anything with

> vector data but the most basic operations in ENVI. Seeing that it's an

> image analysis program, I would be surprised if it's vector capabilities

> are very robust. Conversely, if you had ArcGIS you could probably

> convert your vector data to your required format in 5 minutes.

I recall a conversation with Adam, the main programmer of ENVI, in which he told me ENVI was going to design their own map projection software because "IDL's sucked". I took this with a grain of salt because, well, you had to know Adam. Nevertheless, I've never heard a word of protest about ENVI's map projections, but I do, occasionally, hear complaints about IDL's. I am wondering now if this is what he meant by that remark. And if so, why don't we have access to those ENVI routines?

This is the first time I've ever run into a problem with

the map projections, although I don't do much of this. I have, on several occasions, had to work harder than I thought I ought to be working to get a decent result, but I have the same problem with my service game on a tennis court, so I haven't been too bothered by it. This is the first time I just have not been able to come up with what I consider a satisfactory result.

The fact that Jean can get continental outlines on the image in other software really points to a MAP_SET deficiency as the culprit, it seems to me. At least that is my current hypothesis.

Cheers,

David

--

David Fanning, Ph.D.

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Subject: Re: AVHRR Image Mapping Problem
Posted by [James Kuyper](#) on Fri, 15 Dec 2006 21:19:49 GMT
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Matt wrote:

> There is no right and wrong standard parallels. The standard parallels

In this context, there is such a thing as the "right" standard parallels. The TIFF file was created using a particular map projection, and the parallels of that map projection are the ones that you have to use to interpret the raw data correctly.

> Raster data in Albers centered on Africa
> Vector data for the world in some other projection, probably centered
> on the prime meridian

I would guess that the vector data is stored as latitude and longitude, and converted automatically to the current projection. The vector data could be inaccurate, but the more plausible assumption is that the real parameters of the Albers projection used to create the raster data are different from the documented values of those parameters; that's the possibility I was trying to explore.

Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Fri, 15 Dec 2006 21:42:45 GMT
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kuyper@wizard.net writes:

> I would guess that the vector data is stored as latitude and longitude,
> and converted automatically to the current projection. The vector data
> could be inaccurate, but the more plausible assumption is that the real
> parameters of the Albers projection used to create the raster data are
> different from the documented values of those parameters; that's the
> possibility I was trying to explore.

This is pretty much my take on the problem, too.
I can believe the vector data supplied with IDL could
be inaccurate (I used the low-resolution data and not
the high), but the fact that the GSHHS high resolution
vector data shows the same problem leads me to think
it is a map projection problem of some sort.

I guess one other possibility is that the parallels
are correct, but the corners of the image are not.
(I did verify that the numbers I use are the same
as those listed in the documentation.) But changing
numbers in a random way reminds me too much of object
graphics programming to get too excited about THAT
possibility. :-(

Cheers,

David

--

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Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Fri, 15 Dec 2006 21:46:22 GMT
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David Fanning writes:

> I guess one other possibility is that the parallels
> are correct, but the corners of the image are not.
> (I did verify that the numbers I use are the same
> as those listed in the documentation.) But changing

> numbers in a random way reminds me too much of object
> graphics programming to get too excited about THAT
> possibility. :-(

Whoa!! About the third number I switched suddenly solved
the problem! Uh, how do I justify THIS!? Talk about an
empirical programming style...

Cheers,

David

--

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Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Sat, 16 Dec 2006 01:45:40 GMT
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David Fanning writes:

> Whoa!! About the third number I switched suddenly solved
> the problem! Uh, how do I justify THIS!? Talk about an
> empirical programming style...

Just for completeness, here is my *final* solution. (That
is, I'm not fooling with it anymore!)

Here are the changes I made:

1. Changed standard parallels from -19 and 21 to
-19.9999 and 20.0001. (Don't know if this is
needed or not.)

2. Changed the locations of the center of the corner
pixels like this (found empirically):

```
; YX coordinates of the four corners (LL, UL, UR, LR)
; longitude = [-23.49, -24.6, 64.523, 63.414]
; longitude = [-22.49, -24.6, 64.523, 61.414]
; latitude = [-42.243, 43.711, 43.712, -42.242]
; latitude = [-42.743, 43.711, 43.712, -40.500]
```

Here is how the final map projection looks now:

<http://www.dfanning.com/misc/final.png>

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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

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Subject: Re: AVHRR Image Mapping Problem

Posted by [Chris\[2\]](#) on Sat, 16 Dec 2006 05:43:23 GMT

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Hi all,

1. Start iMap.
2. File->Open, open one of your Africa images
3. Double click on the image to bring up property sheet, edit the color table to your liking
4. Insert->Map continents
5. Click on the Map tab on the right, change plot range to lon [-30, +70], lat [-45, +45]
6. (bonus) Window->Data Manager, open your image data, click on GeoTIFF tags node, then click on the GeoTIFF tags property to view the tags.

Everything looks fine to me:

<http://atoc.colorado.edu/~torrence/imapAfrica.png>

-Chris
ITTVIS

Subject: Re: AVHRR Image Mapping Problem

Posted by [David Fanning](#) on Sat, 16 Dec 2006 15:13:33 GMT

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Chris Torrence writes:

- > 1. Start iMap.
- > 2. File->Open, open one of your Africa images
- > 3. Double click on the image to bring up property sheet, edit the color table to your liking
- > 4. Insert->Map continents

- > 5. Click on the Map tab on the right, change plot range to lon [-30, +70],
- > lat [-45, +45]
- > 6. (bonus) Window->Data Manager, open your image data, click on GeoTIFF tags
- > node, then click on the GeoTIFF tags property to view the tags.
- >
- > Everything looks fine to me:

Yes, I agree, it looks a hell of a lot better than my attempt with iMap yesterday! But I'm not so sure it's any better than where I started. The color table you have chosen here masks the problem a little bit. If you inverse it, you see the problem more clearly.

This iMap solution did give me a clue to set the CENTER_LAT keyword to 1, if I use the original standard parallels of -19 and 21. I like this better than changing them to -19,9999 and 20.0005 the way I did yesterday.

This gives me more or less what iMap is giving me, but--again--just not quite right. I find I still have to tweak the positions of the corner pixels just slightly to get everything aligned to my satisfaction.

But, a couple of questions about iMap. I don't want to display the original data. I want to display a processed image with a particular set of colors (I think there are 15). So a processed, byte-scaled image with a particular color table. How would I get to this point after reading the GeoTiff file into iMap? Or, would I have to do this in a different way? I think this is what confused me about iMap yesterday.

Cheers,

David

--

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Subject: Re: AVHRR Image Mapping Problem
Posted by [Chris\[2\]](#) on Sun, 17 Dec 2006 20:11:09 GMT
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Hi David,

Good point about iMap. Currently, the problem is that the GeoTIFF tags cannot be passed in as a keyword. It has to come from the file. I'll try to address this in the next IDL version. In the meantime, you *can* pass in the GeoTIFF as a data parameter, like this:

```
-----
file = 'AF03sep15b.n16-Vlg.tif' ;dialog_pickfile()
image = Read_Tiff(file, GEOTIFF=geoTiff, ORIENTATION=orien)
if (orien eq 1) then image = Reverse(image,2)
LOADCT, 39, /SILENT
TVLCT, r, g, b, /GET
rgb = Transpose([r],[g],[b])
rgb[*,0] = 255 ; make background white
image >= 0 ; clip all negative values

; Ugly part which should go away in the next IDL version...
oParmSet = OBJ_NEW('IDLitParameterSet')
oParmSet->Add, OBJ_NEW('IDLitDataIDLImagePixels', image), $
    PARAMETER_NAME='IMAGEPIXELS'
oParmSet->Add, OBJ_NEW('IDLitDataIDLPalette', rgb), $
    PARAMETER_NAME='PALETTE'
oParmSet->Add, OBJ_NEW('IDLitDataIDLGeoTIFF', geotiff), $
    PARAMETER_NAME='GEOTIFF'

iMap, INITIAL_DATA=oParmSet

; Change the map limits. Also should go away in next IDL version...
it = itgetcurrent(Tool=oTool)
oDS = (oTool->GetSelectedItems())[0]->GetDataspace(/UNNORM)
oMap = oDS->_GetMapProjection()
oMap->SetProperty, LIMIT=[-45,-30,45,70]
oDS->OnProjectionChange

; Insert continents.
void = oTool->DoAction('Operations/Insert/Map/Continents')
oCont = (oTool->GetSelectedItems())[0]
oCont->SetProperty, FILL_BACKGROUND=0, COLOR=[255,0,0]

; Export to a bitmap file. This part is optional...
oDesc = oTool->GetByIdentifier('Operations/File/Export')
oExport = oDesc->GetObjectInstance()
; File suffix will automatically determine the file type.
oExport->SetProperty, FILENAME='outAfrica.png', $
    SOURCE=1, $ ; do the entire window
    SHOW_EXECUTION_UI=0, SCALE_FACTOR=2
void = oExport->DoAction(oTool)
```

oExport->SetProperty, SHOW_EXECUTION_UI=1

You can see how you can mess around with both the image data and the palette before passing them into the Parameter Set. In the next IDL version, this should be much simpler, something like:

...read data...

...mess with image and palette...

iMap, image, GEOTIFF=geoTiff, RGB_TABLE=rgb, LIMIT=[-45,-30,45,70]

...insert continents...

Anyway, hope this helps. You're right about the image registration. iMap looks good, but not perfect. I'll have to think about it some more. It looks like a couple of pixels, not just something like half a pixel, which would be easy to explain...

Cheers,
Chris
ITTVIS

"David Fanning" <news@dfanning.com> wrote in message
news:MPG.1fedbaf54e8d8289989e52@news.frii.com...

> Chris Torrence writes:

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>> Everything looks fine to me:

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> than my attempt with iMap yesterday! But I'm not

> so sure it's any better than where I started. The

> color table you have chosen here masks the problem

> a little bit. If you inverse it, you see the problem

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> Cheers,
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> David
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> Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Sun, 17 Dec 2006 20:36:48 GMT
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Chris Torrence writes:

> Anyway, hope this helps. You're right about the image registration. iMap
> looks good, but not perfect. I'll have to think about it some more. It looks
> like a couple of pixels, not just something like half a pixel, which would
> be easy to explain...

Chris, thanks for this. It helps.

I wouldn't be too hard on iMap. I believe now the problem isn't an IDL problem at all. I think the center of the pixels is just NOT what the documentation says they are. (It, uh, wouldn't be the first time that satellite data documentation was wrong, in my admittedly limited experience. In fact, I've seldom found it to be RIGHT!)

In any case, experience leads me toward a documentation error in the satellite docs rather than toward an implementation error in IDL.

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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

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Subject: Re: AVHRR Image Mapping Problem

Posted by [Richard French](#) on Mon, 18 Dec 2006 02:46:44 GMT

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

On 12/17/06 3:36 PM, in article MPG.1fef584c7fc06f23989e53@news.frii.com, "David Fanning" <news@dfanning.com> wrote:

> I wouldn't be too hard on iMap. I believe now the problem
> isn't an IDL problem at all. I think the center of
> the pixels is just NOT what the documentation says they
> are.

David,

If one trusted the data headers from Hubble Space Telescope images as a guide to where the spacecraft was actually pointed, one would be up to 10 pixels off - that's because what's listed in the header is where they expected to be pointing, not a reconstructed view of where they were actually pointing. The same is true of Cassini images of Saturn. I don't know about Earth-pointing satellites, but unless one has done some pretty accurate post-image checking, it is not obvious to me that the header information for such an image would have anything other than the predicted location of the image, and you need to find out from experience (or preferably from the spacecraft/instrument teams) what the actual pointing performance is likely to be. Two pixels sounds like reasonable jitter if it is a predicted pointing location.

Dick French

Subject: Re: AVHRR Image Mapping Problem

Posted by [James Kuyper](#) on Mon, 18 Dec 2006 04:05:46 GMT

Richard G. French wrote:

...

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> know about Earth-pointing satellites, but unless one has done some pretty
> accurate post-image checking, it is not obvious to me that the header
> information for such an image would have anything other than the predicted
> location of the image,

I only know about one instrument (MODIS) on two Earth-pointing satellites (Terra and Aqua), but I'm personally responsible for the geolocation on the MODIS data from those satellites. The file attributes summarizing the location of a granule are just as accurate as the geolocation which is provided in the MOD03 files for every 1km pixel: the RMS error is nominally 50 meters, though we're actually doing a bit better than that, with our smallest pixel size being 250 meters. Except during a maneuver, the actual orientation of the satellite is used, not the planned orientation.

The software I'm responsible for was modified from software for earlier instruments, and has been borrowed as the basis for software for the VIIRS instrument on NPP, so I suspect this is not uncommon for earth-pointing satellite imagery.

Subject: Re: AVHRR Image Mapping Problem

Posted by [Richard French](#) on Mon, 18 Dec 2006 04:11:13 GMT

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

Thanks for the post - as I mentioned in the part of my post not quoted below:

"you need to find out from experience (or preferably from the spacecraft/instrument teams) what the actual pointing performance is likely to be."

Your post answered that question. It sounds as though pointing error is not the culprit in David's example.

Dick

On 12/17/06 11:05 PM, in article

1166414746.299151.321950@79g2000cws.googlegroups.com, "kuyper@wizard.net"
<kuyper@wizard.net> wrote:

> Richard G. French wrote:
> ...
>
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>> guide to where the spacecraft was actually pointed, one would be up to 10
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> satellite is used, not the planned orientation.
>
> The software I'm responsible for was modified from software for earlier
> instruments, and has been borrowed as the basis for software for the
> VIIRS instrument on NPP, so I suspect this is not uncommon for
> earth-pointing satellite imagery.
>

Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Mon, 18 Dec 2006 04:47:44 GMT
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Richard G. French writes:

> Your post answered that question. It sounds as though pointing error is not
> the culprit in David's example.

I suspect something much more mundane: lousy transcription
or typing skills. Frankly, this kind of struggle is what
I remember from graduate school, and is part of learning
"what's really going on." Probably the correct values are
well-known to everyone who "counts," and the rest of us
have to discover them the same way everyone else had to

discover them. It's all part of gaining confidence that you really do know what you are doing. :-)

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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

Subject: Re: AVHRR Image Mapping Problem
Posted by [wita](#) on Wed, 20 Dec 2006 07:49:25 GMT

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Dear David,

I'm a bit surprised to see all the discussion about the problems with projecting the GIMMS dataset. I did extensive processing of the GIMMS dataset myself (global dataset as well as tiles) and I never experienced any of the problems that have been described. I never experienced any problems with the documentation as well btw.

The main difference is probably that I used ENVI to process it instead of using IDL or iMap. The easiest procedure to process GIMMS I found is to create a script which writes an ENVI META file with references to all individual GeoTIFF files. The META file can be read by ENVI and then it can be saved to a standard ENVI file, which is much faster then working with the individual GeoTIFFs. For an example of GIMMS with the high resolution vectors projected on it see:

<http://www.xs4all.nl/~ajwwag/Screenshot.png>

I am not quite sure whether your problem with GIMMS is solved now (too lazy to read all posts), but I can easily provide you a copy of my processed dataset which is properly georeferenced.

regards,

Allard

Subject: Re: AVHRR Image Mapping Problem

Posted by [David Fanning](#) on Wed, 20 Dec 2006 13:52:58 GMT

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wita writes:

- > I'm a bit surprised to see all the discussion about the problems with
- > projecting the GIMMS dataset. I did extensive processing of the GIMMS
- > dataset myself (global dataset as well as tiles) and I never
- > experienced any of the problems that have been described. I never
- > experienced any problems with the documentation as well btw.
- >
- > The main difference is probably that I used ENVI to process it instead
- > of using IDL or iMap

Yes, I feel confident that ENVI does it correctly. And I also feel confident that I cannot do it correctly, given the information in the file and IDL's map projection routines. So, we are at an impasse. We have not heard from the ENVI guys. :-)

Cheers,

David

P.S. I can also align the map, but only by moving the reported corner pixel positions slightly, which I have no logical reason to do. But sometimes logic is the least helpful thing when it comes to computer programs. :-)

--

David Fanning, Ph.D.

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Subject: Re: AVHRR Image Mapping Problem

Posted by peter.albert@gmx.de on Thu, 21 Dec 2006 07:55:01 GMT

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- > P.S. I can also align the map, but only by moving the
- > reported corner pixel positions slightly, which I have
- > no logical reason to do.

Just a wild guess: Could it be that actually not the centres of the corner pixels are reported but their (outer) edges, assuming e.g. the AVHRR nadir resolution of 1.2 km?

Regards,

Peter

Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Fri, 22 Dec 2006 15:01:32 GMT
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Peter Albert writes:

- > Just a wild guess: Could it be that actually not the centres of the
- > corner pixels are reported but their (outer) edges, assuming e.g. the
- > AVHRR nadir resolution of 1.2 km?

The values are not the pixel edges, this is one of the first things I checked. But, I am wondering if it is actually possible to *calculate* the pixel positions from the GEOTIFF information embedded in the file. Does anyone know how to do that?

Perhaps the information is embedded in the file and I just don't know how to access it. (Maybe this is what you mean by "AVHRR nadir resolution of 1.2 km".)

Cheers,

David

--

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Subject: Re: AVHRR Image Mapping Problem
Posted by [James Kuyper](#) on Fri, 22 Dec 2006 15:47:59 GMT
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Peter Albert wrote:

- >> P.S. I can also align the map, but only by moving the
- >> reported corner pixel positions slightly, which I have
- >> no logical reason to do.
- >
- > Just a wild guess: Could it be that actually not the centres of the
- > corner pixels are reported but their (outer) edges, assuming e.g. the
- > AVHRR nadir resolution of 1.2 km?

I don't know much about AVHRR, but I'd be very surprised if nadir resolution was applicable for all four corner pixels; I'd be fairly surprised if it was applicable for even one of the corner pixels.

Subject: Re: AVHRR Image Mapping Problem
Posted by [Chris\[2\]](#) on Sun, 24 Dec 2006 01:31:35 GMT
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Hi all,

Just another data point: The PDF document on the GIMMS website states that the images are projected onto the Clarke 1866 Ellipsoid, while the GeoTIFF tags in the file indicate that it is WGS-84. I wonder which one is correct.

Now, switching to the Clarke 1866 ellipsoid didn't actually help (it probably only changes it by a few hundred meters or so), but it makes you wonder whether the rest of the GeoTIFF information is accurate given that the ellipsoid is incorrect...

-Chris
ITTVIS

"David Fanning" <news@dfanning.com> wrote in message
news:MPG.1fec703a235800ae989e46@news.frii.com...

> Folks,
>
> Does anyone have any experience working with AVHRR NDVI
> image data or Albers map projection? I have obtained
> the data, which is of the African continent from here:
>
> <ftp://ftp.glcf.umiacs.umd.edu/glcf/GIMMS/Regional/Albers/Africa>
>
> The image is in an Albers Conical equal area projection
> and the centers of the four corner pixels are known from
> the documentation:
>
> ; YX coordinates of the four corners (LL, UL, UR, LR)
> longitude = [-23.49, -24.6, 64.523, 63.414]
> latitude = [-42.243, 43.711, 43.712, -42.242]
>
> This is a GeoTiff file, so I also pull the Standard
> Parallels out of the geotiff information stored in
> the file (they are -19 and 21).
>
> I follow the method outlined on this page (which has

> worked perfectly for a polar stereo map projection),
> using instead of a Stereo projection, an Albers
> projection with standard parallels:
>
> http://www.dfanning.com/map_tips/precipmap.html
>
> The method *ALMOST* works! :-)
>
> But the continental outlines do not QUITE line up properly.
> You can see my result here:
>
> <http://www.dfanning.com/misc/africa.jpg>
>
> Do you think this might be an Albers projection problem?
> A difference between MAP_PROJ_INIT and MAP_SET? (I have
> tried different DATUMS with no change in effect.)
>
> Or, do you think this might just be right? :-(
>
> Cheers,
>
> David
>
> P.S. Don't worry about the colors. They are still screwed up.
> --
> 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: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Sun, 24 Dec 2006 18:03:59 GMT
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Chris Torrence writes:

> Just another data point: The PDF document on the GIMMS website states that
> the images are projected onto the Clarke 1866 Ellipsoid, while the GeoTIFF
> tags in the file indicate that it is WGS-84. I wonder which one is correct.
>
> Now, switching to the Clarke 1866 ellipsoid didn't actually help (it
> probably only changes it by a few hundred meters or so), but it makes you
> wonder whether the rest of the GeoTIFF information is accurate given that
> the ellipsoid is incorrect...

A ray of light today. :-)

Using Chris's initial instructions for how to open and read this GeoTiff file in iMap resulted in the same slight mismatch between the continental outlines and the image. However, this morning I went back to iMap to try again. This time, after I read the geotiff file into iMap, I chose Map Register Image from the Operations menu. Viola! Now when I add continental outlines, they map perfectly.

But, WHERE is this happening in the iTool code!? Your guess is as good as mine. I'm now convinced this can be done in IDL. But I still want to know HOW.

Chris, can you give us any insight into how that iRegister Map wizard works?

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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Subject: Re: AVHRR Image Mapping Problem
Posted by [Richard French](#) on Sun, 24 Dec 2006 18:50:31 GMT
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On 12/24/06 1:03 PM, in article MPG.1ff86efb9ecc411c989e62@news.frii.com, "David Fanning" <news@dfanning.com> wrote:

>
> A ray of light today. :-)

Shouldn't you be shoveling snow or serving coffee to the 500,000 travelers who have spent 8 nights on the snowy runways at the Denver airport?

Dick

Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Sun, 24 Dec 2006 19:01:37 GMT
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Richard G. French writes:

> Shouldn't you be shoveling snow or serving coffee to the 500,000 travelers
> who have spent 8 nights on the snowy runways at the Denver airport?

My office window looks out onto the neighborhood streets, which are a TERRIBLE mess. About every 10 minutes a neighbor comes by and gets stuck in the slop. I run out with a cup of hot chocolate and a shovel to join all the other neighbors in pushing the car out of the mess. I've never met so many neighbors in my life!

Great fun, but between disasters, I work on this terribly vexing problem. I think I'm making a *bit* of progress today. :-)

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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Subject: Re: AVHRR Image Mapping Problem
Posted by [David Fanning](#) on Mon, 25 Dec 2006 20:27:15 GMT
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David Fanning writes:

> A ray of light today. :-)

Sick, sick, sick...

This damn AVHRR image registration problem has been driving me bonkers. I spent about 10 hours on it yesterday, right up until my wife forced me to drink some eggnog for Christmas Eve, and I woke up thinking about it this morning before opening some presents with the family. (My wife thought I was concentrating on the new Christmas CD she gave me.)

But about five minutes ago I finally figured it out.
Perfect!

I'll have an article that describes how it is done out soon, but I just wanted to let everyone know so you could enjoy your Christmas holidays. ;-)

Merry Christmas!

David

P.S. Just so you know, the documentation was wrong (I guess we all assumed that), but everything you need to know is built into the GeoTiff file, if you can just figure out how to decipher it. Those MAP_PROJ* routines are VERY interesting, if exceedingly poorly documented. :-)

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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Subject: Re: AVHRR Image Mapping Problem

Posted by [David Fanning](#) on Tue, 26 Dec 2006 05:55:10 GMT

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David Fanning writes:

- > But about five minutes ago I finally figured it out.
- > Perfect!
- >
- > I'll have an article that describes how it is done
- > out soon, but I just wanted to let everyone know so
- > you could enjoy your Christmas holidays. ;-)

Here is an article that describes how to get PERFECT image registration from AVHRR GeoTIFF files in IDL:

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

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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

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Subject: Re: AVHRR Image Mapping Problem

Posted by [George N. White III](#) on Thu, 28 Dec 2006 15:03:11 GMT

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On Mon, 17 Dec 2006, kuyper@wizard.net wrote:

- > I only know about one instrument (MODIS) on two Earth-pointing
- > satellites (Terra and Aqua), but I'm personally responsible for the
- > geolocation on the MODIS data from those satellites. The file
- > attributes summarizing the location of a granule are just as accurate
- > as the geolocation which is provided in the MOD03 files for every 1km
- > pixel: the RMS error is nominally 50 meters, though we're actually
- > doing a bit better than that, with our smallest pixel size being 250
- > meters. Except during a maneuver, the actual orientation of the
- > satellite is used, not the planned orientation.
- >
- > The software I'm responsible for was modified from software for earlier
- > instruments, and has been borrowed as the basis for software for the
- > VIIRS instrument on NPP, so I suspect this is not uncommon for
- > earth-pointing satellite imagery.

I work with AVHRR and SeaWiFS as well as MODIS. With the older data, each image must be registered using ground control points. This can be done manually in Terascan and SeaDAS, and there are various automated systems. MODIS geolocation eliminates this (tedious and much hated) step.

--

George N. White III <WhiteG@dfo-mpo.gc.ca>
