
Subject: Re: Need GOES Image Expert
Posted by [Paul Van Delst\[1\]](#) on Mon, 17 Mar 2008 20:47:45 GMT
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David Fanning wrote:

> Folks,
>
> A quick question for a GOES image expert. Are the GOES
> satellite images, such as can be found here:
>
> <http://goes.gsfc.nasa.gov/goeseast-lzw/peru/>
>
> in some kind of map projection? Where can I learn about
> these images? The GOES folks don't seem to be making this
> information obvious. :-(

From the same spot:

<http://goes.gsfc.nasa.gov/text/goesfaq.html#goesnav>
and
<http://goes.gsfc.nasa.gov/text/goesfaq.html#tiffcomment>

The former presents more nav info via a link:

<http://goes.gsfc.nasa.gov/text/goestechnotes.html#navigation>

From my experience, the GOES data is typically delivered as a "flat" file that replicates how the instruments actual record the data (e.g. raster scan of the earth disk).

What that translates into wrt a map projection, I have no idea. I don't think GOES data works in that sort or realm (but I haven't used GOES data directly for about a decade, so what the hell would I know! :o)

cheers,

paulv

Subject: Re: Need GOES Image Expert
Posted by [Bob\[3\]](#) on Mon, 17 Mar 2008 20:59:09 GMT
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On Mar 17, 4:32 pm, David Fanning <n...@dfanning.com> wrote:

> Folks,
>
> A quick question for a GOES image expert. Are the GOES
> satellite images, such as can be found here:
>
> <http://goes.gsfc.nasa.gov/goeseast-lzw/peru/>

>
> in some kind of map projection? Where can I learn about
> these images? The GOES folks don't seem to be making this
> information obvious. :-(
>
> 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.")

In addition to what paul said there appears to be lat/lon info for
each pixel available from e.g. <http://goes.gsfc.nasa.gov/goeseast-lzw/peru/maps/>

Subject: Re: Need GOES Image Expert
Posted by [Kenneth P. Bowman](#) on Mon, 17 Mar 2008 21:01:18 GMT
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In article <frmlhdh\$au4\$1@news.nems.noaa.gov>,
Paul van Delst <Paul.vanDelst@noaa.gov> wrote:

> David Fanning wrote:
>> Folks,
>>
>> A quick question for a GOES image expert. Are the GOES
>> satellite images, such as can be found here:
>>
>> <http://goes.gsfc.nasa.gov/goeseast-lzw/peru/>
>>
>> in some kind of map projection? Where can I learn about
>> these images? The GOES folks don't seem to be making this
>> information obvious. :-(
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> From the same spot:
>
> <http://goes.gsfc.nasa.gov/text/goesfaq.html#goesnav>
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> The former presents more nav info via a link:
> <http://goes.gsfc.nasa.gov/text/goestechnotes.html#navigation>
>
> From my experience, the GOES data is typically delivered as a "flat" file that replicates
> how the instruments actual record the data (e.g. raster scan of the earth disk).

>
> What that translates into wrt a map projection, I have no idea. I don't think GOES data
> works in that sort of realm (but I haven't used GOES data directly for about a decade, so
> what the hell would I know! :o)
>
> cheers,
>
> paulv

If you want to plot GOES data on maps, I suggest getting files from the NOAA CLASS archive

<http://www.nsof.class.noaa.gov/saa/products/welcome>

You can order them in a variety of file formats, including my favorite, netCDF.

These files are "navigated", which means that they have a longitude and latitude attached to each pixel, so they can be mapped with MAP_PATCH.

I might even be willing to part with some code to display the files if suitably persuaded. :-)

Ken Bowman

Subject: Re: Need GOES Image Expert
Posted by [David Fanning](#) on Mon, 17 Mar 2008 21:06:42 GMT
[View Forum Message](#) <> [Reply to Message](#)

Bob Crawford writes:

> In addition to what paul said there appears to be lat/lon info for
> each pixel available from e.g. [http://goes.gsfc.nasa.gov/goeseast-lzw/peru/m=](http://goes.gsfc.nasa.gov/goeseast-lzw/peru/m=aps/)
> [aps/](#)

Yes, I have the navigation data. What do I do with it? :-)

Suppose, for example, I wished to put state boundaries and rivers on this map. How would I go about doing so?

I suppose I could use the navigation data to establish a limit for a map projection, but what map projection? Satellite? Guess I could try it.

Cheers,

David

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: Need GOES Image Expert

Posted by [David Fanning](#) on Mon, 17 Mar 2008 22:06:49 GMT

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David Fanning writes:

> I suppose I could use the navigation data to establish
> a limit for a map projection, but what map projection?
> Satellite? Guess I could try it.

OK, well, I'm in the ballpark with a satellite projection,
but I'm guessing my satellite is not sitting directly
over the center of my image. Where is it? How could I
find out?

```
; IDL> help, image  
; IMAGE  BYTE [1200, 862]
```

```
; Corner points.
```

```
; IDL> print, peru_lat[0,0], peru_lat[0, 861],  
;     peru_lat[1199, 861], peru_lat[1199,0]  
;     -19.4763  12.9533  12.9516  -19.4735  
; IDL> print, peru_lon[0,0], peru_lon[0, 861],  
;     peru_lon[1199, 861], peru_lon[1199,0]  
;     -99.3065  -98.2939  -51.8151  -50.8084
```

```
; right, top, left, bottom of image for LIMIT.
```

```
; IDL> print, peru_lat[0,431], peru_lat[600, 861],  
;     peru_lat[1199, 431], peru_lat[600,0]  
;     -3.03467  12.7686  -3.03430  -19.1762  
; IDL> print, peru_lon[0,431], peru_lon[600, 861],  
;     peru_lon[1199, 431], peru_lon[600,0]  
;     -97.5755  -75.0291  -52.5294  -75.0302
```

```
IDL> Window, XSIZE=1200, YSIZE=862
```

```
IDL> Map_Set, -3.03449, -75.0296, /Satellite, SAT_P=[6.5,0.0,0.0], $  
    XMargin=0, YMargin=0, $  
    LIMIT=[-3.0347, -97.5755, 12.7686, -75.0291, $
```

-3.0343, -52.5294, -19.1762, -75.0302]

IDL> TVIMAGE, image
IDL> Map_CONTINENTS
IDL> MAP_GRID

Folks, you *know* being just a little bit off drives me to crazy. Please help. I'm completely out of Xanax. All I have left is a box of Viagra, left over from Coyote's last tete-a-tete. :-(

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: Need GOES Image Expert
Posted by [KRDean](#) on Mon, 17 Mar 2008 22:13:54 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Mar 17, 3:06 pm, David Fanning <n...@dfanning.com> wrote:
> Bob Crawford writes:
>> In addition to what paul said there appears to be lat/lon info for
>> each pixel available from e.g.[http://goes.gsfc.nasa.gov/goeseast-lzw/peru/m=](http://goes.gsfc.nasa.gov/goeseast-lzw/peru/m=aps/)
>> aps/
>
> Yes, I have the navigation data. What do I do with it? :-)
>
> Suppose, for example, I wished to put state boundaries
> and rivers on this map. How would I go about doing so?
>
> I suppose I could use the navigation data to establish
> a limit for a map projection, but what map projection?
> Satellite? Guess I could try it.
>
> Cheers,
>
> David
>
> 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.")

Your are on the right track, you can use MAP_SET, Nadir_lat, and Nadir_long, /Satellite, the four corners (LIMIT) and along with [P, Omega, Gamma], which are [~6.5, 0.0, 0.0]. These numbers are variable depending on the satellite (GOES-E, GOES-W). They get you in the ball park, but get worse the farther you get from nadir along the equator.

My first choice (although slow) are to use MAP_PATCH, WARP_TRI, or combination Poly2D and POLYWARP. MAP_IMAGE doesn't work. Use either of these routines to remap the satellite image, latitude, longitude navigation arrays from NASA GSFC into the desire map projection that is set by MAP_SET, then you can use the MAP_GRID and MAP_CONTINENTS to get the desire geo-political boundaries provided by ITTVIS on top.

I had web pages providing examples of each of these remapping methods, but they have been removed by my previous employer.

Kelly Dean
(was an IDL GOES Image expert at one time)
Fort Collins, CO

P.S. NASA GSFC would not be my first chioce for GOES data. I like to get my GOES data from www.class.noaa.gov.

Subject: Re: Need GOES Image Expert
Posted by [KRDean](#) on Mon, 17 Mar 2008 22:20:04 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Mar 17, 4:06 pm, David Fanning <n...@dfanning.com> wrote:

- > David Fanning writes:
- >> I suppose I could use the navigation data to establish
- >> a limit for a map projection, but what map projection?
- >> Satellite? Guess I could try it.
- >
- > OK, well, I'm in the ballpark with a satellite projection,
- > but I'm guessing my satellite is not sitting directly
- > over the center of my image. Where is it? How could I
- > find out?
- >
- > ; IDL> help, image
- > ; IMAGE BYTE [1200, 862]
- >
- > ; Corner points.

```

> ;IDL> print, peru_lat[0,0], peru_lat[0, 861],
> ;      peru_lat[1199, 861], peru_lat[1199,0]
> ;      -19.4763   12.9533   12.9516   -19.4735
> ;IDL> print, peru_lon[0,0], peru_lon[0, 861],
> ;      peru_lon[1199, 861], peru_lon[1199,0]
> ;      -99.3065   -98.2939   -51.8151   -50.8084
>
> ; right, top, left, bottom of image for LIMIT.
> ;IDL> print, peru_lat[0,431], peru_lat[600, 861],
> ;      peru_lat[1199, 431], peru_lat[600,0]
> ;      -3.03467   12.7686   -3.03430   -19.1762
> ;IDL> print, peru_lon[0,431], peru_lon[600, 861],
> ;      peru_lon[1199, 431], peru_lon[600,0]
> ;      -97.5755   -75.0291   -52.5294   -75.0302
>
> IDL> Window, XSIZE=1200, YSIZE=862
> IDL> Map_Set, -3.03449, -75.0296, /Satellite, SAT_P=[6.5,0.0,0.0], $
>   XMargin=0, YMargin=0, $
>   LIMIT=[-3.0347, -97.5755, 12.7686, -75.0291, $
>     -3.0343, -52.5294, -19.1762, -75.0302]
> IDL> TVIMAGE, image
> IDL> Map_CONTINENTS
> IDL> MAP_GRID
>
> Folks, you *know* being just a little bit off drives me
> to crazy. Please help. I'm completely out of Xanax.
> All I have left is a box of Viagra, left over from
> Coyote's last tete-a-tete. :-(
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> 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.")

```

Provide all four corners as 8 numbers in LIMIT will make some improvements.

From my experience, remapping provides the best results.

Kelly Dean
Fort Collins, CO

Subject: Re: Need GOES Image Expert

Posted by [David Fanning](#) on Mon, 17 Mar 2008 22:26:40 GMT

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kBob writes:

- > Provide all for corners as 8 numbers in LIMIT will make some
- > improvements.
- > =46rom my experience, remapping provides the best results.

The documentation says "sides". You are saying "corners".
Do you know something the documentation doesn't?

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

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

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

Subject: Re: Need GOES Image Expert

Posted by [David Fanning](#) on Mon, 17 Mar 2008 22:58:25 GMT

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kBob writes:

- > My first choice (although slow) are to use MAP_PATCH, WARP_TRI, or
- > combination Poly2D and POLYWARP. MAP_IMAGE doesn't work. Use either of
- > these routines to remap the satellite image, latitude, longitude
- > navigation arrays from NASA GSFC into the desire map projection that
- > is set by MAP_SET, then you can use the MAP_GRID and MAP_CONTINENTS to
- > get the desire geo-political boundaries provided by ITTVIS on top.

The MAP_PATCH method gets me closer. (And looks a lot better
if I wear my old glasses.) If I pretend not to notice the
bottom of the map, I may be OK.

You do have to specify the sides of the image in the limit,
though.

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: Need GOES Image Expert
Posted by [David Fanning](#) on Mon, 17 Mar 2008 23:21:12 GMT
[View Forum Message](#) <> [Reply to Message](#)

David Fanning writes:

> The MAP_PATCH method gets me closer. (And looks a lot better
> if I wear my old glasses.) If I pretend not to notice the
> bottom of the map, I may be OK.

I'll probably write an article about this, but I think
the bottom line is there is no good way to do this
exactly. The MAP_PROJ_INIT method is even worse than
the MAP_SET method, and for exactly the reason I mentioned
the other day: MAP_PROJ_INIT doesn't give you the ability
to specify the eight-element LIMIT you need to create the
proper map projection space.

I hate to be getting on a new soapbox, but we need
better map projection support 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: Need GOES Image Expert
Posted by [KRDean](#) on Tue, 18 Mar 2008 00:13:07 GMT
[View Forum Message](#) <> [Reply to Message](#)

On Mar 17, 5:21 pm, David Fanning <n...@dfanning.com> wrote:
> David Fanning writes:
>> The MAP_PATCH method gets me closer. (And looks a lot better
>> if I wear my old glasses.) If I pretend not to notice the
>> bottom of the map, I may be OK.
>
> I'll probably write an article about this, but I think

> the bottom line is there is no good way to do this
> exactly. The MAP_PROJ_INIT method is even worse than
> the MAP_SET method, and for exactly the reason I mentioned
> the other day: MAP_PROJ_INIT doesn't give you the ability
> to specify the eight-element LIMIT you need to create the
> proper map projection space.
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> I hate to be getting on a new soapbox, but we need
> better map projection support in IDL. :-(
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> Cheers,
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> 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.")

Don't base your experience with GOES that ITTVIS needs better map projection support. GOES is a notorious wobbler. NOAA provides GOES image as raw data. That is why NASA GSFC provides complex algorithm to do the navigation and they don't work all the time, either. Loop some GOES data and watch the clouds dance. Especially after they do some station keeping.

EUMETSAT does a great job remapping their METEOSAT data before they releasing it to the public. Navigation wise, working with METEOSAT data is a dream and GOES data can be a pain most of the time.

Kelly Dean
Fort Collins, CO

Subject: Re: Need GOES Image Expert
Posted by [David Fanning](#) on Tue, 18 Mar 2008 05:24:02 GMT
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Kenneth P. Bowman writes:

> If you want to plot GOES data on maps, I suggest getting files from the NOAA CLASS
> archive
>
> <http://www.nsof.class.noaa.gov/saa/products/welcome>
>
> You can order them in a variety of file formats, including my favorite, netCDF.

Alright, in the future I'll screen my clients more carefully. :-)

> These files are "navigated", which means that they have a longitude and latitude
> attached to each pixel, so they can be mapped with MAP_PATCH.

Well, I have an image, and I have the navigation files. I've run them through MAP_PATCH, and waited the 10 minutes while they are processed. The results are "nearly" correct, depending to a large extent on which pair of glasses I've managed to find.

They are reasonably correct in the center of the image, and much less so near the edges. I've explained to my client that he must be interested in data only near the center of the image, but he just stared at me. I don't know what his problem is.

> I might even be willing to part with some code to display the files if
> suitably persuaded. :-)

Well, I can't make you rich, just famous. :-)

Cheers,

David

P.S. Oh, hang on! I was going to make an image to show you what I am talking about, but just for kicks I set the HIRES keyword on MAP_CONTINENTS. The results are MUCH better. Not perfect. But too good for me to complain.

Then I tried the GSHHS data files, and the results are even better. Sorry I wasted your time. I'll write an article though, because I never understood what you were suppose to do with navigation files.

Map projections are fun again! :-)

--

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: Need GOES Image Expert
Posted by [Kenneth P. Bowman](#) on Tue, 18 Mar 2008 16:12:54 GMT
[View Forum Message](#) <> [Reply to Message](#)

In article <MPG.2248ffd8c771f40598a2d8@news.frii.com>,
David Fanning <news@dfanning.com> wrote:

> P.S. Oh, hang on! I was going to make an image to show you
> what I am talking about, but just for kicks I set the
> HIRES keyword on MAP_CONTINENTS. The results are MUCH
> better. Not perfect. But too good for me to complain.
>
> Then I tried the GSHHS data files, and the results are
> even better. Sorry I wasted your time. I'll write an
> article though, because I never understood what you
> were suppose to do with navigation files.

There goes my chance for fame. :-(

Ken

Subject: Re: Need GOES Image Expert
Posted by [Mark Conner](#) on Thu, 20 Mar 2008 17:08:37 GMT
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On Mar 17, 7:13 pm, kBob <KRD...@gmail.com> wrote:

> On Mar 17, 5:21 pm, David Fanning <n...@dfanning.com> wrote:

>> David Fanning writes:

>>> The MAP_PATCH method gets me closer. (And looks a lot better

>>> if I wear my old glasses.) If I pretend not to notice the

>>> bottom of the map, I may be OK.

>

>> I'll probably write an article about this, but I think

>> the bottom line is there is no good way to do this

>> exactly. The MAP_PROJ_INIT method is even worse than

>> the MAP_SET method, and for exactly the reason I mentioned

>> the other day: MAP_PROJ_INIT doesn't give you the ability

>> to specify the eight-element LIMIT you need to create the

>> proper map projection space.

>

>> I hate to be getting on a new soapbox, but we need

>> better map projection support 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.")

>

> Don't base your experience with GOES that ITTVIS needs better map

- > projection support. GOES is a notorious wobbler. NOAA provides GOES
- > image as raw data. That is why NASA GSFC provides complex algorithm to
- > do the navigation and they don't work all the time, either. Loop some
- > GOES data and watch the clouds dance. Especially after they do some
- > station keeping.
- >
- > EUMETSAT does a great job remapping their METEOSAT data before they
- > releasing it to the public. Navigation wise, working with METEOSAT
- > data is a dream and GOES data can be a pain most of the time.
- >
- > Kelly Dean
- > Fort Collins, CO- Hide quoted text -
- >
- > - Show quoted text -

There isn't really a way to map GOES data using an IDL map projection (or any other, such as ESRI). To do a proper job on it, you need to remap the data. I've never been thrilled with IDL's MAP_* for remapping/regridding, so I pretty much do my own. The best way to do it is to have a lat/lon-to-i/j function so that for each point in your desired grid, you get to the i/j coordinates in the original data. This generally requires the full GVAR data stream which contains the necessary metadata. If you have only already-computed lats/lons, then you're kinda stuck with a search mechanism.

If you want the complete gory details on how to do this for GVAR data, look at the ELUG document at this page:
<http://www.osd.noaa.gov/gvar/gvardownload.htm>

The FORTRAN code in this document has been translated to IDL here:
<http://www.ncdc.noaa.gov/oa/rsad/satfaq/class-goes-nav.html> (download the tarball towards the bottom of the page, look at the mcidas_nav.pro file)

Bottom line is that it's not an easy solution.

METEOSAT (1st and 2nd generation) and MTSAT are much easier because they are in a normalized geostationary projection that might even be directly compatible with the geostationary projection in IDL (haven't tried it).

- Mark

Mark D. Conner
Sr. Staff Scientist
Atmospheric & Environmental Research, Inc.