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 <frmldh$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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>   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

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
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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=
> 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
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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=
>> 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
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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. :-(
>
> 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 for 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

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

Subject: Re: Need GOES Image Expert
Posted by David Fanning on Mon, 17 Mar 2008 22:58:25 GMT

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

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

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
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> the MAP_SET method, and for exactly the reason I mentioned
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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
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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.
>
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>> David Fanning, Ph.D.
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> Don't base your experience with GOES that ITTVIS needs better map

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> 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.