Subject: CGMAP_GSHHS: problem with land/water colors
Posted by Matteo on Wed, 14 Aug 2013 19:08:27 GMT

Hi,

I noticed using CGMAP_GSHHS.PRO that if no ocean waters are present on a map, the LAND keyword for the land color does not work properly. Here's a snippet code that reproduces the problem (note that it is very similar to the one included in the examples of the CGMAP_GSHHS header). Just set your PATH to include the CGxxx routines and the correct directory for the gshhs.b file.


```
PRO test_gshhs

!path=[SET PATH HERE]
datafile='./gshhs_h.b' [SET PATH TO GSHHS_H.B HERE]

 ; include some water
 map_limits = [29.,-95.,34.,-88]
 ; land only
 ;map_limits = [31.,-95.,34.,-88]

     cgDisplay, 500, 350
     pos = [0.1,0.1, 0.9, 0.8]

 ; set map projection
 cgmap_set, limit = map_limits, /mercator, position=pos

 ; set a SKYBLUE background
     cgColorfill, [pos[0], pos[0], pos[2], pos[2], pos[0]], $
             [pos[1], pos[3], pos[3], pos[1], pos[1]], $
             /Normal, Color='skyblue'

 ; issue CGMAP_GSHHS
     cgMap_GSHHS, datafile, Fill=1, Level=4, Color='black', /Outline, $
      Land='tan', Water_color='skyblue', NoClip=0

 ; overdraw state borders
 cgmap_set, limit = map_limits, /mercator, /continents, position=pos, $
   color='yellow', /usa, /noerase
END
```


Run the program first with map_limits set to include some Gulf waters around Lousiana (map_limits = [29.,-95.,34.,-88]). Then comment in the 'land only' option to exclude the water at the lower latitudes.
In the latter case I obtain a SKYBLUE rather than a TAN background, which is obviously wrong.

Furthermore, the WATER_COLOR keyword only works for inland water bodies, therefore CGCOLORFILL must be used to start from a SKYBLUE background.

You will also notice that having to reissue CGMAP_SET at the end to draw state borders (yellow) over everything leads to imperfect overlap with the black GSHHS shorelines, expected because of the different resolution.

I would appreciate if anybody could take a look at it. Apologies to David if I'm mistaking the correct usage of his routine.

m

Subject: Re: CGMAP_GSHHS: problem with land/water colors
Posted by David Fanning on Wed, 14 Aug 2013 19:15:31 GMT
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Matteo writes:

> You will also notice that having to reissue CGMAP_SET at the end to draw state borders (yellow) over everything leads to imperfect overlap with the black GSHHS shorelines, expected because of the different resolution.
>
> I would appreciate if anybody could take a look at it. Apologies to David if I'm mistaking the correct usage of his routine.

OK, before I get into this mess, are you using the LATEST version of this software?

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
Sepore ma de ni thue. ("Perhaps thou speakest truth.")

Subject: Re: CGMAP_GSHHS: problem with land/water colors
Posted by David Fanning on Wed, 14 Aug 2013 19:38:56 GMT
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Matteo writes:

> I noticed using CGMAP_GSHHS.PRO that if no ocean waters are present on a map, the LAND keyword for the land color does not work properly. Here's a snippet code that reproduces the problem (note that it is very similar to the one included in the examples of the CGMAP_GSHHS header). Just set your PATH to include the CGxxx routines and the correct directory for the gshhs.b file.

Well, it appears your observation is correct, but your explanation is wrong. :-)

I have a bit of code in here to speed things up:

```
 xy = Convert_Coord(lon, lat, /Data, /To_Normal)
 check = ((xy[0,*] GE !X.Window[0]) AND (xy[0,*] LE !X.Window[1])) AND $
      ((xy[1,*] GE !Y.Window[0]) AND (xy[1,*] LE !Y.Window[1]))
 usePolygon = Max(check)
```

Your particular example appears to be a perverse one, because no land polygons ever set the usePolygon flag to 1, so land polygons are not filled.

If you set usePolygon=1 just after this code and run your program, you will see it does the right thing, but takes a LONG time to run. (I used the intermediate resolution file. You seem to be using the high resolution file, which I wouldn't recommend. That will take an EXTREMELY long time to run!)

So, the problem is to understand why these land polygons aren't being drawn. I presume it is because they have one or more vertices outside the map boundary. I'll have to see what I can do about this. I don't know how many polygons there are, but the term "millions" comes to mind. I'll see if I can find the 3-4 I am looking for. It may be awhile before I get back in touch. :-(

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
Sepore ma de ni thue. ("Perhaps thou speakest truth.")

Subject: Re: CGMAP_GSHHS: problem with land/water colors
Posted by David Fanning on Wed, 14 Aug 2013 20:08:29 GMT
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Matteo writes:

> Run the program first with map_limits set to include some Gulf
> waters around Lousiana (map_limits = [29.,-95.,34.,-88]). Then
> comment in the 'land only' option to exclude the water at the
> lower latitudes. In the latter case I obtain a SKYBLUE rather
> than a TAN background, which is obviously wrong. Furthermore,
> the WATER_COLOR keyword only works for inland water bodies,
> therefore CGCOLORFILL must be used to start from a SKYBLUE background.

OK, here is the problem. To speed things up I assume that I don't want
to draw polygons that are outside the plot area. So, I exclude any
polygon in which all of its vertices are outside the drawing area. The
polygon we want to draw in this zoomed-in case is, say, the United
States polygon. But, all of its vertices are outside the drawing area,
so it never gets drawn.

In this case, you can "fix" the problem by simply drawing with a tan
color instead of a skyblue color before drawing the inland water
polygons. In general, it would probably be a better idea to NOT use the
GSHHS data base for drawing such zoomed in plots. I think I would have
used cgMap_Continents instead, and used the GSHHS data for just the
inland waterways, if I needed that much detail. In other words, I think
this is a wrong tool for the job kind of problem. (Unless, of course,
you have a coffee machine nearby and you don't really care now long it
all takes.)

You have to "fill" oceans with the fill color before you start to draw
because the GSHHS data doesn't include ocean polygons. In other words,
the oceans are what's left (the negative space) after you fill all the
other polygons in the file.

> You will also notice that having to reissue CGMAP_SET at the end to
> draw state borders (yellow) over everything leads to imperfect
> overlap with the black GSHHS shorelines, expected because of
> the different resolution.

You don't have to do this, and I don't know why you think so. I would
just use cgMap_Continents and just draw the state outlines:

  cgMap_Continents, /usa, color='yellow'

Here is the code I used to draw the "correct" plot in this particular
instance.

PRO test_gshhs

    datafile='C:\IDL\data\gshhs\gshhs_2.2\gshhs\gshhs_i.b'

```
  ; include some water
  ;map_limits = [29.,-95.,34.,-88]
  ; land only
  map_limits = [31.,-95.,34.,-88]

  cgDisplay, 500, 350, /free
  pos = [0.1,0.1, 0.9, 0.8]

  ; set map projection
  cgmap_set, limit = map_limits, /mercator, position=pos

  ; set a SKYBLUE background
  cgColorfill, [pos[0], pos[0], pos[2], pos[2], pos[0]], $
     [pos[1], pos[3], pos[3], pos[1], pos[1]], $
     /Normal, Color='tan'

  ; issue CGMAP_GSHHS
  cgMap_GSHHS, datafile, Fill=1, Level=4, Color='black', $
     Land='tan', Water_color='skyblue'

  ; overdraw state borders
  cgMap_Continents, /usa, color='yellow'
END
```

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
Sepore ma de ni thue. ("Perhaps thou speakest truth.")

Subject: Re: CGMAP_GSHHS: problem with land/water colors
Posted by David Fanning on Wed, 14 Aug 2013 20:33:55 GMT
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David Fanning writes:

> I think I would have
> used cgMap_Continents instead, and used the GSHHS data for just the
> inland waterways, if I needed that much detail. In other words, I think
> this is a wrong tool for the job kind of problem. (Unless, of course,
> you have a coffee machine nearby and you don't really care now long it
> all takes.)

Here is how I would have written this code. It works with either of your two map limits.

```
PRO test_gshhs

    datafile='C:\IDL\data\gshhs\gshhs_2.2\gshhs\gshhs_i.b'

    ; include some water
    map_limits = [29.,-95.,34.,-88]
    ; land only
    ;map_limits = [31.,-95.,34.,-88]

    cgDisplay, 500, 350, /free
    pos = [0.1,0.1, 0.9, 0.8]

    ; set map projection
    cgmap_set, limit = map_limits, /mercator, position=pos

    cgColorFill, Position=pos, Color='tg5'
    cgMap_Continents, color='tan', /continents, /fill

    ; issue CGMAP_GSHHS
    cgMap_GSHHS, datafile, Fill=1, Level=2, Color='black', $
        Water_color='blu4'

    ; overdraw state borders
    cgMap_Continents, /usa, color='yellow'

    cgPolygon, Position=pos, Color='black'
END
```

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
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Subject: Re: CGMAP_GSHHS: problem with land/water colors
Posted by Matteo on Wed, 14 Aug 2013 21:57:39 GMT
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Hi David,

thank you very much. Every time I tried to respond I was being anticipated ;-). I realized I could start off a TAN background but the fact is that I need to batch process a lot of files containing flight transect to be overlaid to these maps (the map boundaries are automatically calculated). So I needed the code to just "know" where land and water are. Another solution could be using a land/water flag and switch CGCOLORFILL between TAN and SKYBLUE after checking if there's any ocean pixel within the map boundaries. I guess it'd be similar in concept to your Convert_Coord solution. It is a bit annoying to see racial discrimination among inland water bodies (try map_limits = [29.,-125.,44.,-105], but it doesn't matter at this point.

m

Subject: Re: CGMAP_GSHHS: problem with land/water colors
Posted by David Fanning on Wed, 14 Aug 2013 22:41:51 GMT
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Matteo writes:

> thank you very much. Every time I tried to respond I was being anticipated ;-). I realized I could start off a TAN background but the fact is that I need to batch process a lot of files containing flight transect to be overlaid to these maps (the map boundaries are automatically calculated). So I needed the code to just "know" where land and water are. Another solution could be using a land/water flag and switch CGCOLORFILL between TAN and SKYBLUE after checking if there's any ocean pixel within the map boundaries. I guess it'd be similar in concept to your Convert_Coord solution. It is a bit annoying to see racial discrimination among inland water bodies (try map_limits = [29.,-125.,44.,-105], but it doesn't matter at this point.
>

Here is what I've finally come up with that I like quite a lot. It seems
to work correctly for all of your map limits.

```
PRO test_gshhs

   datafile='C:\IDL\data\gshhs\gshhs_2.2\gshhs\gshhs_i.b'

   ; include some water
   ;map_limits = [29.,-95.,34.,-88]
   ; land only
   ;map_limits = [31.,-95.,34.,-88]
   map_limits = [29.,-125.,44.,-105]
   cgDisplay, 500, 350, /free
   pos = [0.1,0.1, 0.9, 0.8]

   ; set map projection
   cgmap_set, limit = map_limits, /mercator, position=pos

   cgColorFill, Position=pos, Color='tg5'
```

```
    cgMap_Continents, color='tan', /continents, /fill, /hires

    ; issue CGMAP_GSHHS
    cgMap_GSHHS, datafile, Fill=1, Level=2, Color='black', $
       Water_color='blu4'

    ; overdraw state borders
    cgMap_Continents, /usa, color='yellow'
    ;cgMap_Continents, /continents, color='black', /hires
    cgMap_GSHHS, datafile, color='black'

    cgPolygon, Position=pos, Color='black'
END
```

Cheers,

Dvaid
--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
Sepore ma de ni thue. ("Perhaps thou speakest truth.")