Subject: Re: Trying to map georeferenced data with NaN's
Posted by David Fanning on Thu, 01 Sep 2005 21:46:25 GMT
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Chris Konig writes:

```
>  Hi there
>
>  I have 2D arrays that contain values from 0 - 100 (percentages) as well
>  as plenty of NaN's (NaN is not the same as zero for me) on a regular
>  lon/lat grid. I.e. I have
>
>  GRIDDED         FLOAT     = Array[1801, 150]
>  LAT_GRID        FLOAT     = Array[150]
>  LON_GRID         FLOAT     = Array[1801]
>
>  The latter two contain the locations.
>
>  *** What I would like to do:
>  I would like to see my data on a map with the NaN's in a different
>  color. The built-in plotting routine seem to always show NaN's as zeros,
>  which is not ok for me.
>
>  *** What I've tried so far:
>
>  ; Prepare plotting
>  loadct, 1, bottom=20, ncolors=101, /silent    ; ct for data (see below)
>  device, decomposed=0, retain = 2
>  window, 2, xsize=1200, ysize=500
>  landColor = fsc_color('charcoal',200)
>  NaNcolor = fsc_color('light gray',10)
>
>  map_set, /hires, /continents, con_color=landColor, $
>           limit=[58, -180, 89, 180], /cylindrical      ; Data is Arctic
>
>  ; Let's treat the data
>  gr_is_nan = where(finite(gridded,/NAN),count)
>  if (count lt 0) then gridded[gr_is_nan] = -10
>  gridded_plot = gridded + 20
>  ; data now going from 10 to 120 (10: NaN, 20-120: values)
```

I think this will work, but it seems, uh, strange. :-)
I think I would grid the data like this into values 20 to 120:

```
   gridded_plot = BytScl(gridded, /NAN, Top=100) + 20B
```

Then, to set the NAN pixels:

```
   nanindices = Where(Finite(gridded, /NAN) EQ 0, count)
   IF count GT 0 THEN gridded_plot[nanindices] = 10B
```

Next, you want to tell the contour plot where to get its
colors from:

```
   c_colors = Indgen(101) + 20 ; from 20 to 120
```

```
>  ; Plot it
>  contour,gridded_plot, x_grid, y_grid, /cell_fill, $
>          levels = indgen(11)*10+20, $
>          /overplot
```

Add the contour colors:

```
 contour,gridded_plot, x_grid, y_grid, /cell_fill, $
         levels = indgen(11)*10+20, $
         /overplot, C_COLORS=c_colors
```

```
>  *** Problems I have (in decreasing importance):
>  - NaN's are not shown in in NaNcolor but with the same color as zeros
>  (or not at all?), even though that had been working for me at some other
>  point.
```

Scaling and contour colors should solve this problem.

```
>
>  - The data seems to become rescaled, i.e. the rearranged data values
>  (from 20-120) do not use the color indices from 20-120 but from 0-255.
>  Can I tell 'contour' *not* to rescale? Should I use another plotting
>  command instead? Which one? And it works with maps?
```

You were forgetting the C_COLOR keyword to the contour command.

```
>  - If I try to overplot data from another time (a new 'gridded') it does
>  not completely overplot earlier data, but only where it is not NaN.
>  (This might be connected to the first question.)
```

I think it is. Try the new scaling approach.

```
>  - I get "Floating underflow" errors each time I call 'contour'. Why? How
>  can I prevent them?
```

I'll add your name to the petition we are sending to
RSI. There are 854,356 names ahead of yours. (Uh, I think
I've added my own name more than once. :-) And, by the way,
they are not "errors", they are warnings. They can (almost
always) be safely ignored. You can prevent them by making
sure your minimum value doesn't exceed the underflow value

for your machine:

```
yourdata = yourdata > (marchar(/Double)).xmin
```

It is a gigantic pain in the ass to check them, in my opinion.
Why doesn't RSI check them!? :-)

> - I don't know how I can put titles on my plots. It works for the
> original 'map_set' call, but I would like to update the title with the
> 'contour' or 'map_continents' call, but none of them seem to do anything.

Well, these commands are "overplotting", not "plotting" (as
you are using them), so they are not erasing anything that
exists previously on the display, just drawing over the top
of what is already there. If you wanted a new Title command
you could do the MAP_SET call again, or you could probably
figure out a way to draw and erase the title with XYOUTS.
For example, something like this:

```
MAP_SET, ...., Position=[0.05, 0.05, 0.95, 0.85]
x_title_loc = (!X.Window[1]- !X.Window[0]) / 2 + !X.Window[0]
y_title_loc = 0.92

XYOUTS, x_title_loc, y_title_loc, /Normal, 'This is the Title', $
   Color=FSC_Color('Sky Blue', !D.Table_Size-2), Charsize=1.75, $
   Alignment=0.5
```

And, to erase:

```
XYOUTS, x_title_loc, y_title_loc, /Normal, 'This is the Title', $
   Color=!P.Background, Charsize=1.75, Alignment=0.5
```

Cheers,

David
--
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