Subject: Re: Map Projection
Posted by Andy Sayer on Tue, 22 Oct 2013 17:45:40 GMT
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I'd echo the previous suggestion of regular map_set and map_continents above as a simple(r) way to draw a map, unless you're trying to do something fancy.

Andy

On Tuesday, October 22, 2013 1:25:03 PM UTC-4, Morgan Silverman wrote:
> On Tuesday, October 22, 2013 11:08:04 AM UTC-4, David Fanning wrote:
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>> Morgan Silverman writes:
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>>>> I'm trying to create a basic plot with a map of the US and trajectory data plotting on top. I'm trying to follow the map projection method using mapCoord = Obj_New('cgmap', 'Lambert Azimuthal', Limit=limit).
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>>>> I keep coming across an ellipsoid statement in most of the examples I've found but I can't find any explanation as to what it is. Different examples have use ellipsoid=24, ellipsoid=19, ellipsoid=WGS84, etc...I don't know if I need this or how to set it if I do.
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>>>> Can someone please explain what the ellipsoid statement is?
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>> When most people come to maps for the first time they believe what they
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>
>> learned in grade school: that every point on the Earth can be described
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>
>> with a latitude and longitude value. Which is true. But what they
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>
>> *don't* tell you is that no point on the Earth has a *unique* latitude
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>>
>
>> and longitude value. What you are calling *this* latitude and *this*
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>
>> longitude depend on what reference standard you are using. This is
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>
>> called a "datum", or in your case, the "ellipsoid".
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>> If you use a GPS device to find your location on the Earth, it is
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>
>> probably being calculated with a WGS84 ellipsoid, the standard ellipsoid
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>
>> for most satellite data. If you plot that point on a map projection
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>
>> using a spherical ellipsoid (the default ellipsoid for many map
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>

>> projections) then the point you place on the map projection to
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>> illustrate your position will NOT be the point on the Earth where you
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>
>> are standing! You can be many, many meters off, simply because you are
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>
>> using different reference ellipsoids to calculate latitude and
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>
>> longitude.
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>>> And, is mapCoord=Obj_New('cgmap', ...) the best way to go about
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>
>> plotting a map of the United States?
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>> It has pretty much always worked for me. :-)
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>> The nice thing about cgMap is that is *doesn't* work in lat/lon space,
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>> where people coming to map projections for the first time think you are
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>>
>
>> suppose to be working. It works in projected meter space, which is a
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>
>> MUCH better place to be in if you are working with rectangular map
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>
>> projected images.
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>> If you are trying to put data on top of a coordinate system set up with
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>
>> cgMap, you are going to have to pass the coordinate system object to
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>
>> whatever routine (cgContour, cgPlotS, etc.) you are using, so it knows
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>
>> how to convert the lat/lon values you are trying to plot into the
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>
>> projected meter values of the coordinate system.
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>> If this seems beyond your abilities, then I would simply use cgMap_Set
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>> to set up the map and keep working in lat/lon. It's not ideal. But, it
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>> often works well enough for the purpose.
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>> Cheers,
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>> David
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>> David Fanning, Ph.D.
>
>>
>
>> Fanning Software Consulting, Inc.
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>> Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
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>
>> Sepore ma de ni thue. ("Perhaps thou speakest truth.")
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>

> Thank you for the explanation. I'm still not sure how to determine what the ellipsoid should be though. I used 19 in my code based on one of your gallery examples but I don't know if that would be correct. I'm plotting model back-trajectories over the map.
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>
> mapCoord = Obj_New('cgmap', 'Equirectangular', Ellipsoid=19, Limit=limit, $
>
> xrange=xrange, yrange=yrange, /latlon_ranges, center_lon=centerlon, position=pp)
>
> mapCoord -> Draw
>
> cgMap_Grid, map=mapCoord, /box
>
> cgMap_Continents, map=mapCoord, /continents, /countries, /usa
>
> cgplots, lon_1500(index), lat_1500(index), map=mapCoord
>
>
>
> Thanks.
>
> -Morgan
