
Subject: Re: Map Projection

Posted by [morganlsilverman](#) on Tue, 22 Oct 2013 17:25:03 GMT

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On Tuesday, October 22, 2013 11:08:04 AM UTC-4, David Fanning wrote:

> Morgan Silverman writes:

>

>

>

>> 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).

>

>>

>

>> 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.

>

>>

>

>> Can someone please explain what the ellipsoid statement is?

>

>

>

> When most people come to maps for the first time they believe what they

>

> learned in grade school: that every point on the Earth can be described

>

> with a latitude and longitude value. Which is true. But what they

>

> *don't* tell you is that no point on the Earth has a *unique* latitude

>

> and longitude value. What you are calling *this* latitude and *this*

>

> longitude depend on what reference standard you are using. This is

>

> called a "datum", or in your case, the "ellipsoid".

>

>

>

> If you use a GPS device to find your location on the Earth, it is

>

> probably being calculated with a WGS84 ellipsoid, the standard ellipsoid

>

> for most satellite data. If you plot that point on a map projection

>

> using a spherical ellipsoid (the default ellipsoid for many map

>
> projections) then the point you place on the map projection to
>
> illustrate your position will NOT be the point on the Earth where you
>
> are standing! You can be many, many meters off, simply because you are
>
> using different reference ellipsoids to calculate latitude and
>
> longitude.
>
>
>
>> And, is mapCoord=Obj_New('cgmap',) the best way to go about
>
> plotting a map of the United States?
>
>
>
> It has pretty much always worked for me. :-)
>
>
>
> The nice thing about cgMap is that is **doesn't** work in lat/lon space,
>
> where people coming to map projections for the first time think you are
>
> suppose to be working. It works in projected meter space, which is a
>
> MUCH better place to be in if you are working with rectangular map
>
> projected images.
>
>
>
> If you are trying to put data on top of a coordinate system set up with
>
> cgMap, you are going to have to pass the coordinate system object to
>
> whatever routine (cgContour, cgPlotS, etc.) you are using, so it knows
>
> how to convert the lat/lon values you are trying to plot into the
>
> projected meter values of the coordinate system.
>
>
>
> If this seems beyond your abilities, then I would simply use cgMap_Set

>
> to set up the map and keep working in lat/lon. It's not ideal. But, it
>
> often works well enough for the purpose.
>
>
>
> 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.")

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.

```
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
