Subject: Re: Map Projection
Posted by David Fanning on Tue, 22 Oct 2013 15:08:04 GMT
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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

--
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Coyote's Guide to IDL Programming: http://www.idlcoyote.com/
Sepore ma de ni thue. ("Perhaps thou speakest truth.")
