Subject: Re: Converting map altitude coordinates (Z)
Posted by David Fanning on Mon, 07 Feb 2011 16:38:54 GMT
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mankoff writes:

> Thanks for the clarification and suggested reading. Yes my thinking is
> a bit fuzzy. I've been doing mapping work for several years now but
> there is *always* another layer of complexity to unravel.
>
> Each data point has an elevation (ellipsoid height) and a geographic
> lat and lon. This isn't helpful as you mention datum and geoid, but
> not ellipsoid. I think the ellipsoid is probably a simple geoid model?
> Except you state that geoid is mean sea level, in which case I
> shouldn't have values of -28 above this, so perhaps ellipsoid isn't
> geoid.
>
> Any hints how to convert from ellipsoid to something where local sea
> level is 0 m?

You have me pretty much out on thin ice now. :-)

The geoid is usually taken to be the mean sea level. It looks more like a wavy ellipse, because sea level varies from point to point due to underlaying rock, etc. Typically, you choose your datum (ellipsoid and reference point) to match the geoid at the chosen location you plan to study. If you look at a diagram of the geoid and the reference ellipsoid, the geoid will flow inside and outside the boundaries of the ellipsoid, but, if you have chosen well, will generally track the ellipsoidal boundary.

I would guess, in your case, that "altitude" is measured from the geoid. This would explain how it could have a negative value with respect to the ellipsoid. (How would an instrument measure the "height" above some fictional reference ellipsoid!? It seems to me it has to have some reference to measure against.)

So, I can't really answer your question, because I'm not really sure what is being measured. But, I presume if "altitude" is measured to the geoid, then there ought to be some way to reference not to the WGS84 ellipsoid, but to any ellipsoid you choose to use. In other words, you might have to calculate the "height" difference between a WGS84 ellipsoid and a spherical ellipsoid at some specific point, and then "adjust" the altitude measurement by this difference.

In other words, if the "altitude" at some specific point is -28m from the geoid to the WGS84 ellipsoid, and the difference at that specific

point between the WGS84 ellipsoid and a spherical ellipsoid is +10m, then the point should be adjusted to read -38m. I presume this will have to be done on a point by point basis, since the distance from the WGS84 datum and the spherical datum will vary continuously and in a non-linear way.

Something to think about, anyway. :-)

Cheers,

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

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