
Subject: UTM Map Projection Produces Incorrect Results
Posted by [David Fanning](#) on Mon, 31 Oct 2011 15:48:24 GMT
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Folks,

I have written an article this morning that describes the problem with the UTM map projection in IDL and the reason it creates incorrect results when used with the normal WGS84 datum. (This is the datum that is used for almost all satellite data.)

http://www.idlcoyote.com/map_tips/utmwrong.php

This is a problem that arises, I think, because the GCTP map projection software in IDL is nearly 20 years old and badly in need of an update to bring it up to modern standards. The state of the art in map projection software comes from ESRI, which has now been incorporated into the latest version of ENVI. The ESRI software, as I understand it, relies in part on the proj4 open source software project, which is pretty much the gold standard for open source map projection software. ITTVIS should **seriously** consider either porting the ESRI software to IDL, if their agreement with ESRI allows this, or incorporating the proj4 map projection software into IDL.

Otherwise, the reliability of map projection results in IDL becomes questionable and unsuitable for scientific work.

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.")

Subject: Re: UTM Map Projection Produces Incorrect Results
Posted by [David Fanning](#) on Tue, 01 Nov 2011 17:59:12 GMT
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Chris Torrence writes:

- > Second, there was a bug in the GCTP library: for the
- > UTM projection it did not let you pass in arbitrary

> semimajor/semiminor axis values. Instead, you could
> only use one of the predefined 20 ellipsoids, which
> did not include WGS84. In the IDL documentation for
> MAP_PROJ_INIT, ellipsoids 0-19 would work fine,
> while 20-24 would just default to the Clark 1866
> sphere. Now, ellipsoid #12 (Walbeck) is *identical*
> to WGS84, and will give you the *exact* same results
> as if you had used WGS84.

I note that the Walbeck ellipsoid is only identical
to WGS84 in IDL 8.x. It wasn't identical in IDL 7.1,
but it was so damn close that I'm not going to
quibble with you. I only mention it because of your
emphasis around the words "identical" and "exact". ;-)

> Third, in the !MAP structure, there is a !MAP.A and
> !MAP.E2 which should contain the semimajor and
> eccentricity(squared) values. If !MAP.E2 is zero,
> then you are using a spherical ellipsoid.

Well, they "should", but they don't always.

```
IDL> map = Map_Proj_Init(101, DATUM='WALBECK', ZONE=4)
IDL> Print, map.a, map.e2
      6370997.0    0.00000000
```

These numbers should be 6378137.0 and 0.00669438,
respectively. In this case the value of the
eccentricity in the map structure is misleading,
to say the least.

Cheers,

David

--

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