Subject: Re: GEOMAGNETIC to GEOGRAPHIC coordinate conversion
Posted by zawodny on Wed, 13 Jul 1994 14:25:50 GMT
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In article <CsuDEA.xt@ngdc.noaa.gov> greg@farpoint.ngdc.noaa.gov (Greg Ushomirskiy) writes:
> Has anyone written an IDL routine to convert from geomagnetic latitude/longitude
> to geographic lat/lon?
>

Well here is what I use.

```
;+
; NAME:  MAGLAT
;
; PURPOSE: Convert geographic latitude and longitude to magnetic
;  latitude and longitude.
;
; CATEGORY: Coordinate transformation
;
; CALLING SEQUENCE:
; mlat = MAGLAT(lat,lon,mlon)
; INPUTS:
; Lat A scalar or vector of geographic latitudes
; Lon A scalar or vector of geographic longitudes
;
; OUTPUTS:
; Mlat Primary result, a scalar/vector of magnetic latitudes
; Mlon Optional result, a scalar/vector of magnetic longitudes
;
; COMMON BLOCKS: None
;
; SIDE EFFECTS:  None
;
; RESTRICTIONS:  Latitude should be -90 <= lat <= 90.
;
; PROCEDURE:
; STRAIGHTFORWARD (seems to be the default value of this field).
; MODIFICATION HISTORY:
; Version 1.1, Jan 1993 by J.M.Zawodny NASA LaRC
;  zawodny@arbd0.larc.nasa.gov
;-
function MAGLAT,glat,glon,mlon

; Convert to radians
 a117 = 11.7/!radeg
 alat = glat/!radeg
 alon = (glon-291.)/!radeg
```

```
; Calculate the latitude
 slat = sin(alat)*cos(a117) + cos(alat)*sin(a117)*cos(alon)
 mlat = asin(slat)

; If user wants geomagnetic longitude as well
 if(n_params(0) eq 3) then begin
  ylon = cos(alat)*sin(alon)
  xlon = sin(alat)*sin(a117) - cos(alat)*cos(alon)*cos(a117)
  mlon = atan(ylon,xlon)*!radeg
 endif

; Return the geomagnetic latitude (in degrees)
 return,mlat*!radeg
end
```

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Joseph M. Zawodny (KO4LW) NASA Langley Research Center
Internet: zawodny@arbd0.larc.nasa.gov MS-475, Hampton VA, 23681-0001
TCP/IP: ko4lw@ko4lw.ampr.org Packet: ko4lw@n4hog.va.usa