IDL AACGM DLM Interface

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Beta Warning:

The IDL AACGM DLM interface is still in beta stage. Please test the results thoroughly and report any bugs to me. This is essential in order to provide a high-quality product to the community as quick as possible. I am also interested in hearing whether the results produced by the DLM are in agreement with the output from the original distributions.

Introduction:

IDL AACGM DLM is a Dynamic Link Module (DLM) for the Interactive Data Language (IDL) by Research Systems, Inc. The purpose of this library is to provide easy access to the AACGM library by R. J. Barnes, which is based on algorithms by K. Baker and S. Wing. I do not claim any rights to those routines. My only intellectual assets are in the interface itself. The interface allows calling of the AACGM functions from the IDL command line without any knowledge of the C language. All commands behave like native IDL procedures and are faster than the native IDL implementation of the library.

Installation:

The IDL AACGM DLM interface consists of the files idl_aacgm.dlm and idl_aacgm.so. On UNIX the file idl_aacgm.so is not precompiled. To generate it, execute the procedure "make_idl_aacgm" in IDL. For installation, simply copy the above two files into the IDL executable directory, or into a directory in the search path of the IDL system variable !DLM_PATH. Then set the environment variable AACGM_DAT_PREFIX to the directory that holds the coefficient files plus the prefix of the file name up to the year. For example: setenv AACGM_DAT_PREFIX ~aacgm/coeffs/aacgm_coeffs.

Implemented Procedures:

1. AACGM_LOAD_COEF
   Description: Load AACGM coefficient file.

   Calling Sequence: aacgm_load_coef, year.

Inputs: year: Year of coefficients to be used. Allowed values are 1975, 1980, 1985, 1990, 1995, 2000.

Outputs: None.

Keywords: None.

2. AACGM_CONV_COORD

Description: Convert from geographic to AACGM coordinates and vice versa. Coordinates may be given as vectors. Use this feature to avoid slow IDL loops.

Calling Sequence: aacgm_conv_coord, glat, glon, hgt, mlat, mlon, err, /to_aacgm or aacgm_conv_coord, mlat, mlon, hgt, glat, glon, err, /to_geo.

Inputs: glat, glon: Geographic latitude and longitude.
mlat, mlon: Geomagnetic latitude and longitude.
hgt: Altitude for conversion.

Outputs: glat, glon: Geographic latitude and longitude.
mlat, mlon: Geomagnetic latitude and longitude.
err: Error status of coordinate transformation.

Keywords: to_aacgm: Convert from geographic to AACGM coordinates.
to_geo: Convert from AACGM to geographic coordinates.
order: Specify the order of spherical harmonics used in the conversion.

3. AACGM_MLT

Description: Convert magnetic longitude to magnetic local time.

Calling Sequence: mlt=aacgm_mlt(year, t0, mlong).

Inputs: year: Year of calculation,
t0: Seconds since beginning of year,
mlong: Magnetic longitude.

Outputs: mlt: Magnetic local time.

Keywords: mslong: Variable set to magnetic longitude of the sun.

4. AACGM_MLONG

Description: Convert magnetic local time to magnetic longitude.

Calling Sequence: mlong=aacgm_mlong(year, t0, mlt).

Inputs: year: Year of calculation,
t0: Seconds since beginning of year,
mlt: Magnetic local time.

Outputs: mlong: Magnetic longitude.

License:

History:

v1.0: Initial release.

v1.1: Give error message if both conversion directions specified in AACGM_CONV_COORD.

v1.2: Height parameter in AACGM_CONV_COORD is now vector. The AACGM_MLT routine has been vectorized.

v1.4: Fixed clean-up problem with height_in variable in aacgm_conv_coord.

v1.5: Added AACGM_MLONG and error checking of input parameters.