Subject: [EXTERNAL] GLOW inversion LUT code
Date: Thursday, March 21, 2024 at 3:16:35 PM Eastern Daylight Time
From: Don Hampton
To: Alexander Mule, Clevenger, Hayley L., Cameron Westerlund
CC: Leslie Lamarche
Attachments: favicon.ico

As I mentioned in the meeting I have uploaded the package of GLOW that I use into the Google Drive under Swarm Over Poker:

Google Drive: Sign-in
drive.google.com

The latest version of the code is in the file

glow_invert_tables_v3.f90

(The difference between v2 and v3 has to do with the output files, but the basic calculations do not change).

I use gfortran to compile on my macbook using an apple M1 chip.

The make file for this is called

make_invert_tables.v3

So on my mac I compile with the command

prompt> make -f make_invert_tables.v3

For different flavors of linux there may be significant difference in the switches needed

Note the first line of the make_invert_tables.v3

FC = gfortran : this means that I am using gfortran

FFLAGS = -03 -ffree-line-length-none -std=legacy

The first tow FFLAGS I'm not sure, but the last one I think is needed since the GLOW code is not strict Fortran 90 in some cases.

I predict you may spend a fair amount of time figuring out switches if you have to use a different compiler OS combination.

Once you have the executable program - glow_invert_tables_v3.exe you should be able to run it by:

prompt> ./glow_invert_tables_v3.exe < in.invert.23078

The in.invert.23078 has the parameters needed for day 078 of 2023 (19 Mar).

Those parameters are:

YYDOY : 23078
ut time [in seconds]: 29760
glat [deg]: 65.12
glon [deg]: 212.8 (I think it will take negative values e.g. -147.2, but best to keep it positive)
f107a: average f10.7 flux for 81 days, centered on the date (used by MSIS and IRI90)
f107 : f10.7 flux for the day (used by a SNOE NO profiler)
f107p : f10.7 flux for the previous day (used by MSIS)
Ap : planetary Ap index for that time
Ec : this is not needed for this code since it cycles through Ec and Q, but I keep it there for compatibility with other GLOW generating codes
Q : same as Ec

While running, the code will create to status files fort.12 which is basically what would show up on the prompt, and then a file called `invert_table_stat_v3.txt`
which tells you how many cycles the FOR loops have taken, and then how long the code took to run. On my M1 chip it takes about 1400 seconds.

I have set up the code to write output to a sub-directory under the executable called output/v3/
So in my case this is : `/Users/dlh/Documents/GitHub/INVERT-GLOW/output/v3`

Those should be in the format you are now using.

To create the in.invert.YYDOY files you will have to grab the f107 and Ap data and calculate the f107 average. I may be able to do that for all the SOP dates.

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