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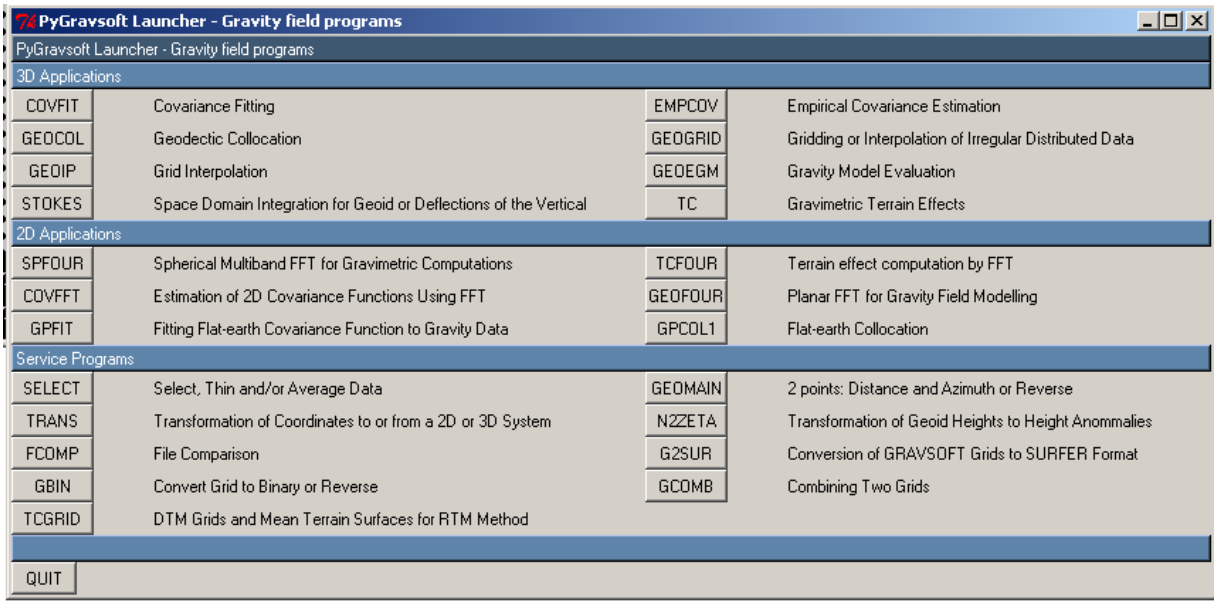
Riyadh workshop. Exercise 2.3.

1. Use the GRAVSOFT software for the evaluation of geoid heights and gravity anomalies over various areas and at various altitudes.

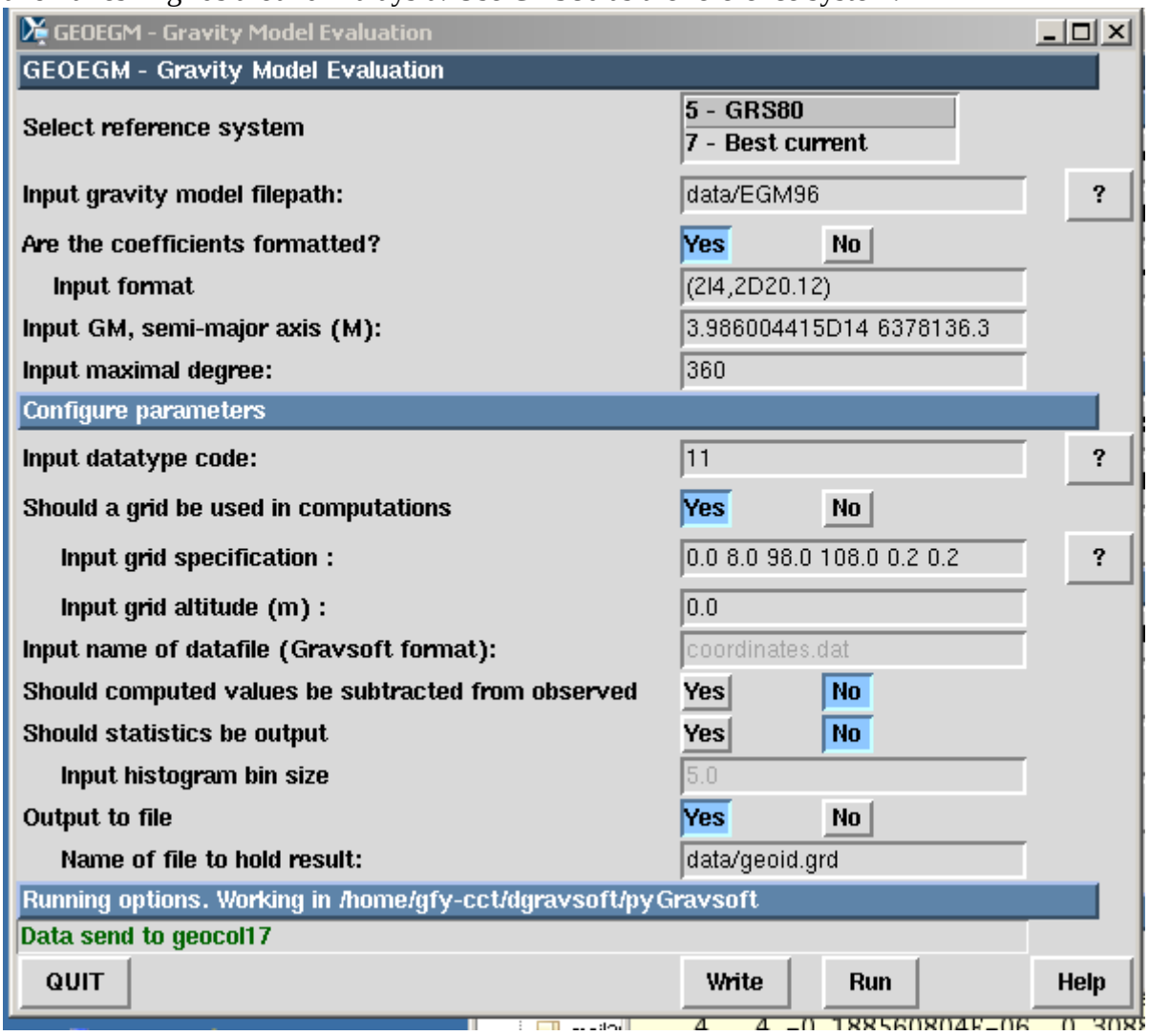
The software should be stored in a directory pyGravsoft, with subdirectories
(a) bin holding the compiled programs
(b) src holding ths source codes of the programs
(c) doc holding documentation
(d) data holding test data to be used in these excercises.

Here we will use only sets of spherical harmonic coefficients, and in the directory you will find the file EGM96. Go to "start" and open a DOS-window with cmd. Then
cd pyGravsoft\data and type
More EGM96.
Then you will see 6 columns. Degree (i), order (j), $\overline{C}_{ij}, \overline{S}_{ij,}$ *and error – estimates.*
Type cd .. and you will be in the directory pyGravsoft
Here you call the launcher.py by typing its name.



We are going to use one module, GEOEGM.

2. Use GEOEGM with EGM96 coefficients for the calculation of geoid heights and gravity anomalies in grids around Malaysia. Use GRS80 as the reference system.



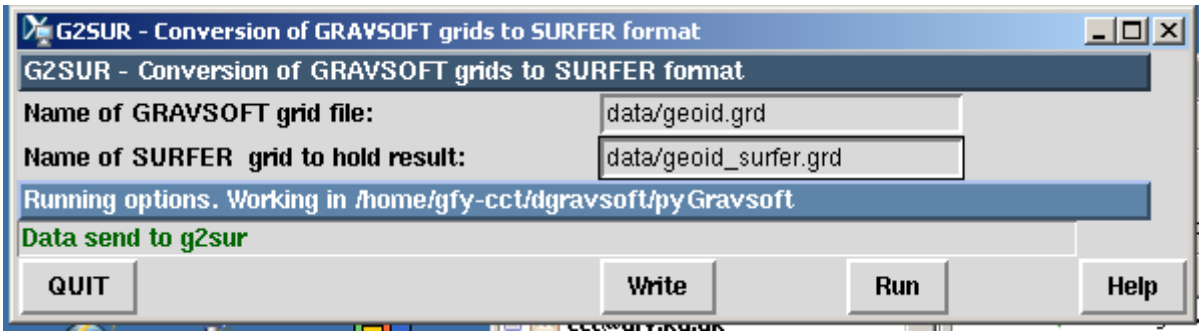
When you type “Write” or “Run” Python will generate a file called geoegm.inp, which may Be used as input to the program bin/geocol17. The output from the run will be at the screen and also stored in a file geoegm.log. The resulting values will be stored on Gravsoft grid format in the file data/geoid.grd.

The first lines of this file look like this:

```
0.000000    8.000000   98.000000  108.000000    0.200000    0.200000
  -27.6006  -26.9909  -26.3098  -25.4217  -24.3322  -23.1849  -22.1367  -21.2451
  -20.4741  -19.7844  -19.1883  -18.7152  -18.3496  -18.0279  -17.6921  -17.3248
  -16.9259  -16.4759  -15.9431  -15.3282  -14.6760  -14.0310  -13.3877  -12.7029
  -11.9560  -11.1824  -10.4358   -9.7268   -9.0152   -8.2653   -7.4922   -6.7411
   -6.0288   -5.3236   -4.5924   -3.8533   -3.1626   -2.5443   -1.9426   -1.2575
   -0.4319    0.4984    1.4370    2.3046    3.0853    3.8090    4.5047    5.1814
    5.8506    6.5567    7.3695
```

It starts with a “label” defining the area, and the the values from North to South and from East to West. Here is shown the first row of values at latitude 8.0 degrees with spacing 0.2 degrees.

Convert the grids to SURFER format using G2SUR, and make a contour plot of the grids.



Job-output to screen and to a file named g2sur.log. The converted grid file is in data/geoid_surfer.grd.