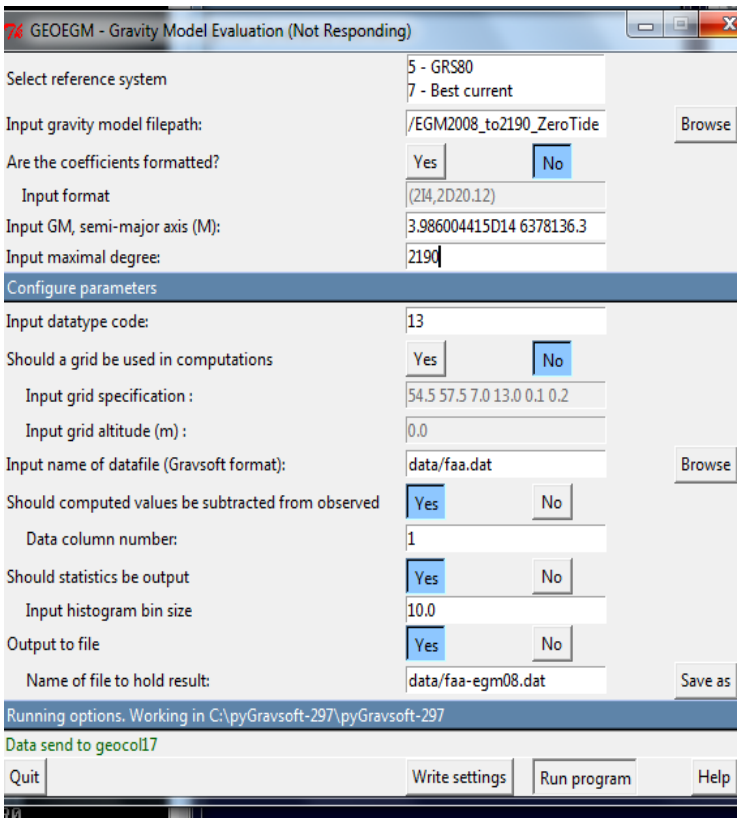
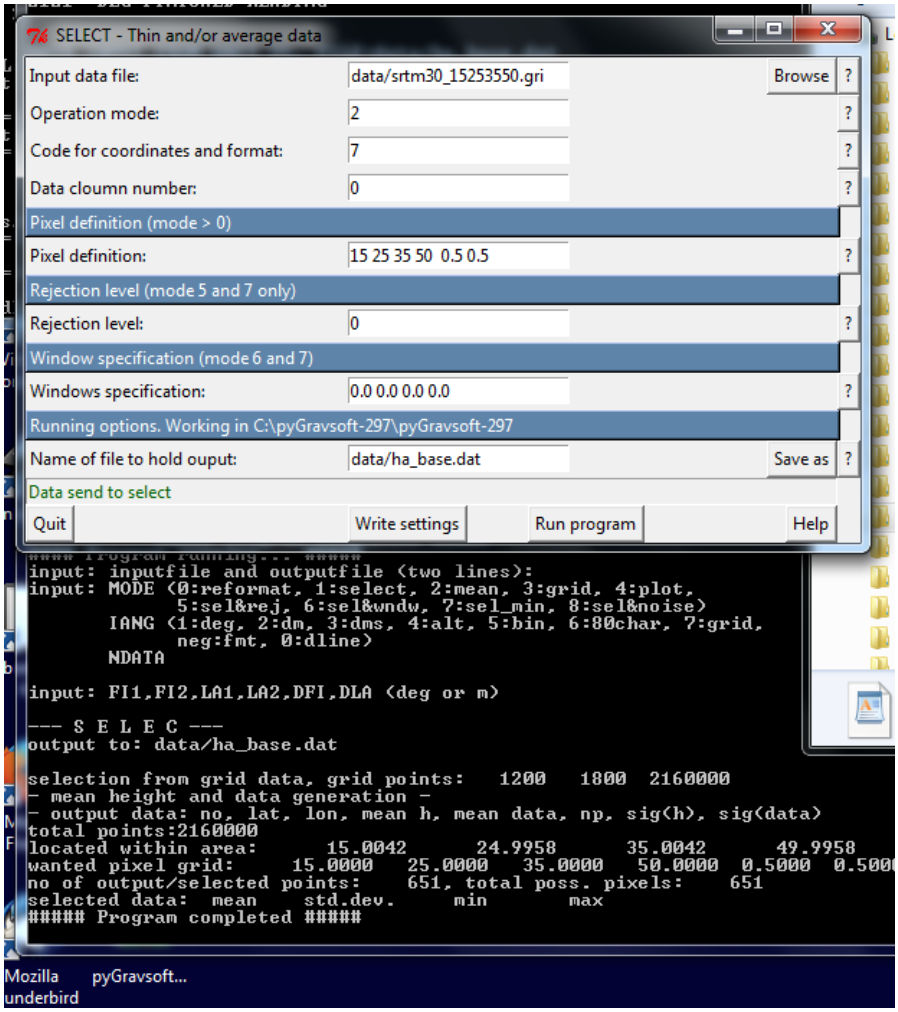
Running height-anomaly prediction for area in KSA. Prepared during workshop.

By C.C.Tscherning, Nov. 2013.

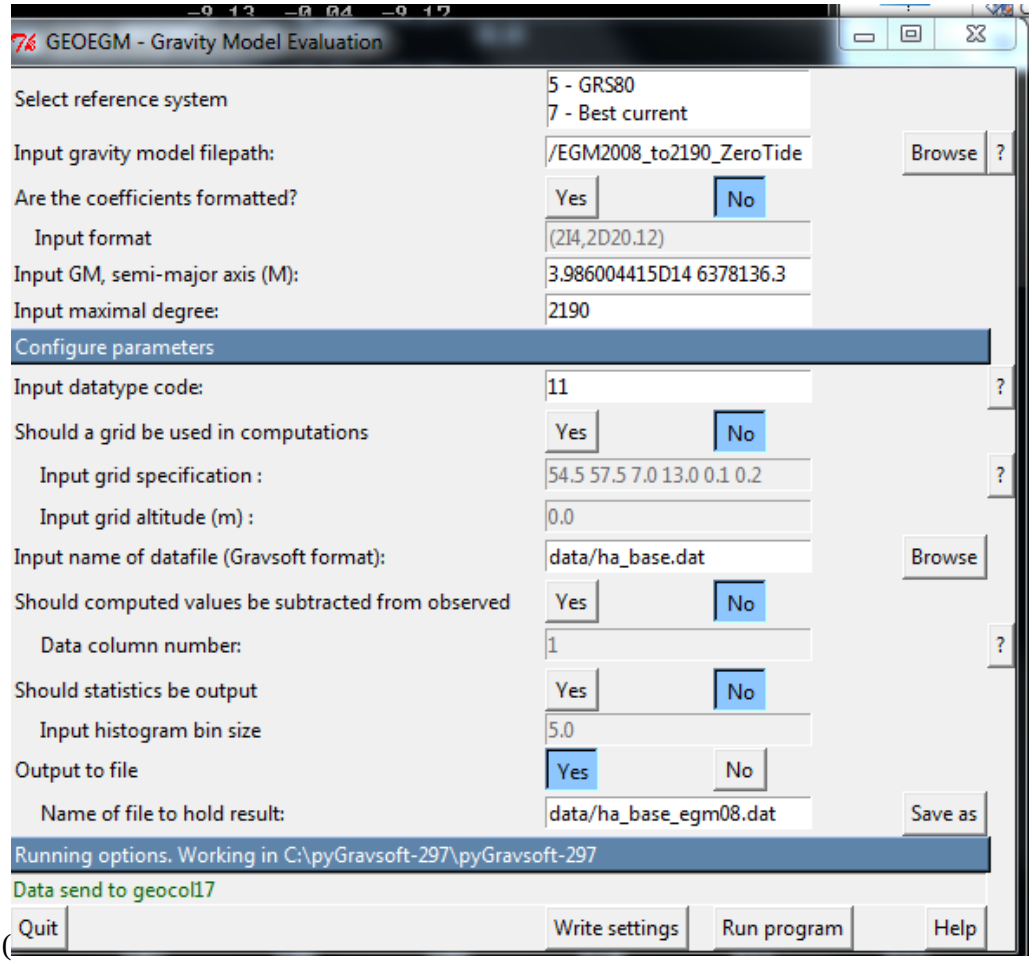
(1) Subtract EGM2008 from faa.dat gravity anomalies.



(2) Subtract RTM effects.



These points are then used as the base for height anomaly computation.



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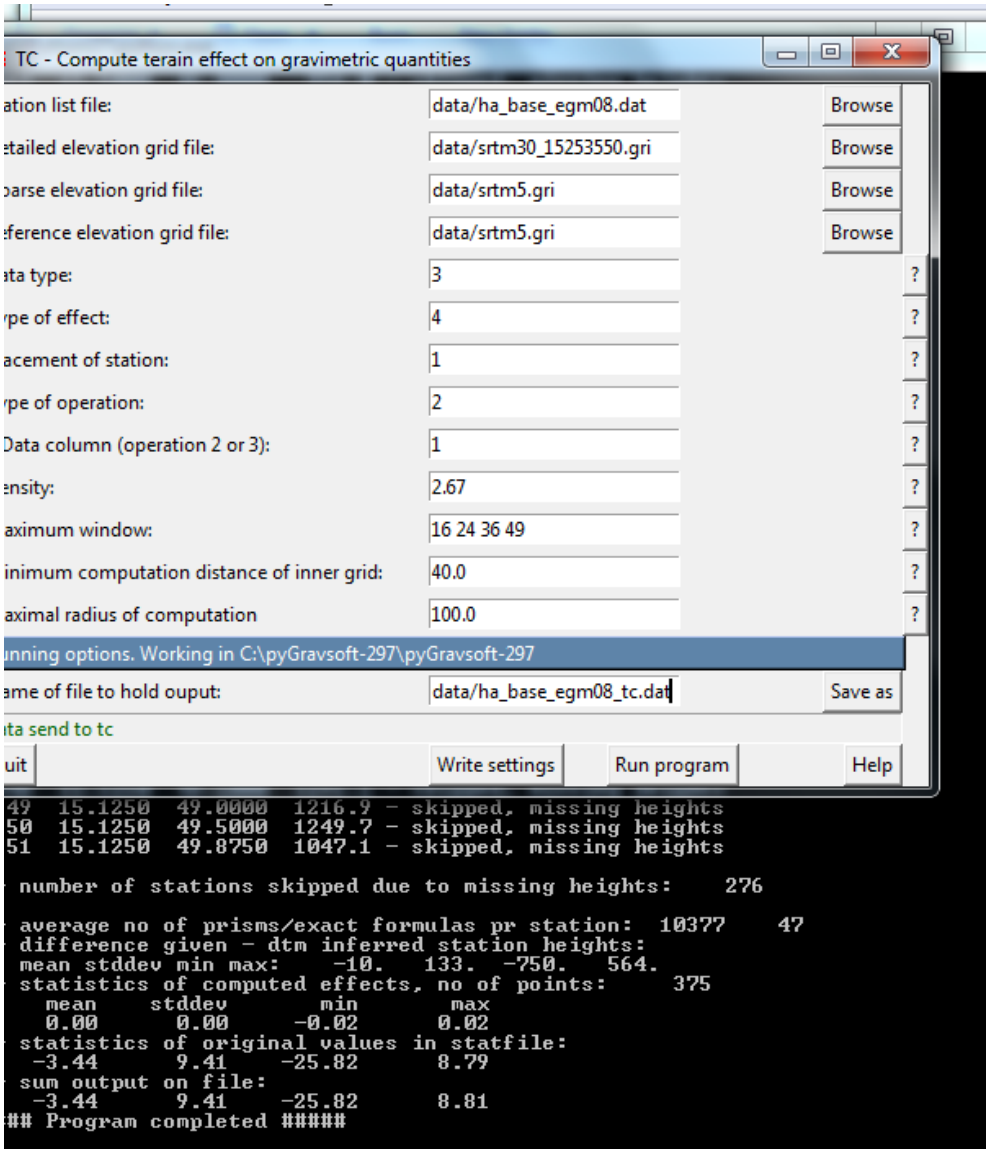
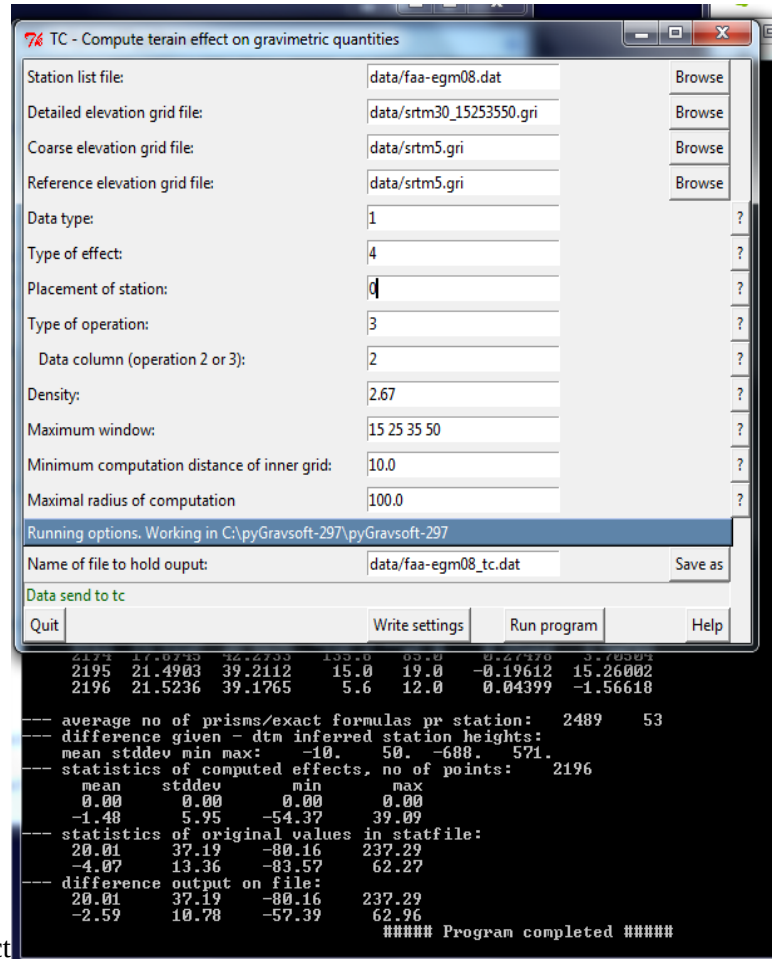
(3) Compute contribution of egm08 in the points

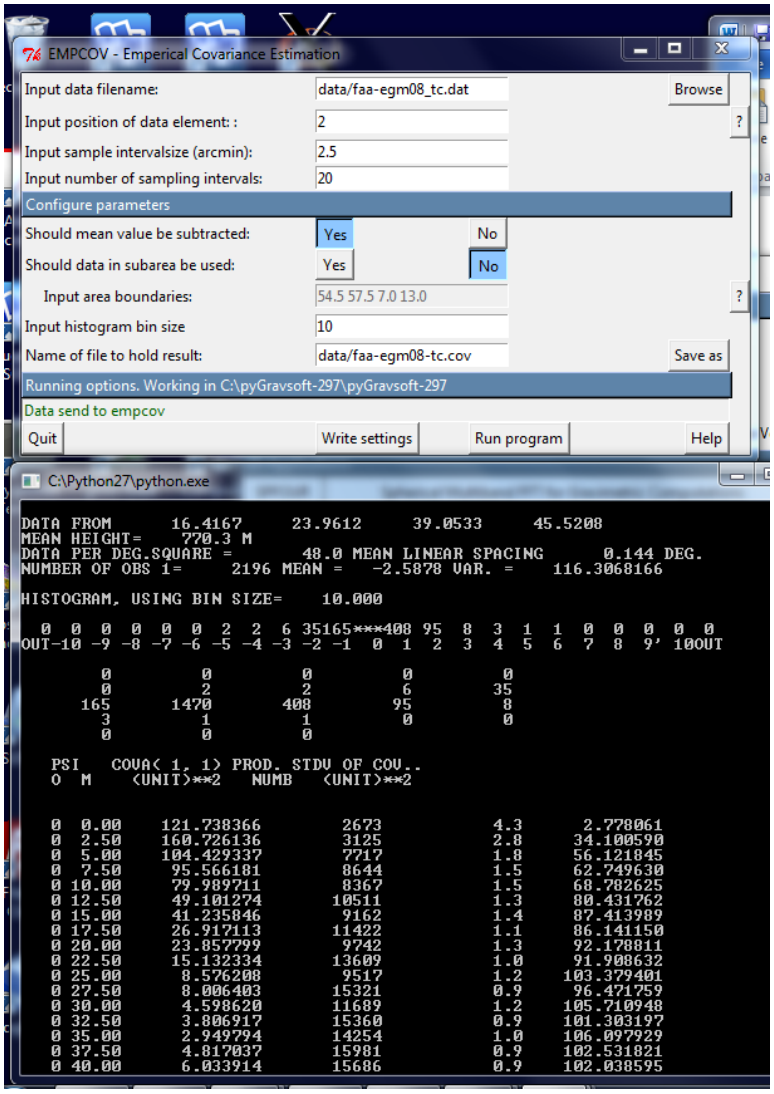
(4) add trm-contribution


TC - Compute terain effect on gravimetric quantities
ation list file:
data/ha_base_egm08.dat
Browse
etailed elevation grid file:
data/srtm30_15253550.gri
Browse
oarse elevation grid file:
data/srtm5.gri
Browse
eference elevation grid file:
data/srtm5.gri
Browse
ata type:
3
?
ype of effect:
4
?
acement of station:
1
?
ype of operation:
2
?
Data column (operation 2 or 3):
1
?
ensity:
2.67
?
aximum window:
16 24 36 49
?
inimum computation distance of inner grid:
40.0
?
aximal radius of computation
100.0
?
unning options. Working in C:\pyGravsoft-297\pyGravsoft-297
ame of file to hold ouput:
data/ha_base_egm08_tc.dat
Save as
ta send to tc
uit
Write settings
Run program
Help
49 15.1250 49.0000 1216.9 - skipped, missing heights
50 15.1250 49.5000 1249.7 - skipped, missing heights
51 15.1250 49.8750 1047.1 - skipped, missing heights
number of stations skipped due to missing heights: 276
average no of prisms/exact formulas pr station: 10377 47
difference given - dtm inferred station heights:
mean stddev min max: -10. 133. -750. 564.
statistics of computed effects, no of points: 375
mean stddev min max
0.00 0.00 -0.02 0.02
statistics of original values in statfile:
-3.44 9.41 -25.82 8.79
sum output on file:
-3.44 9.41 -25.82 8.81
Program completed

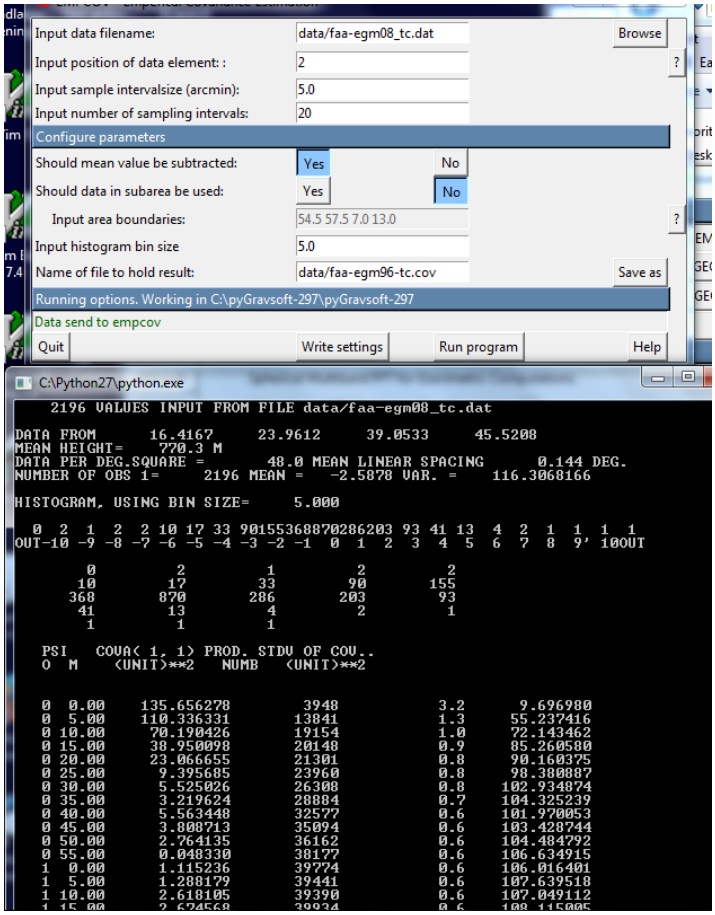
(5) subtract 

from gravity anom.

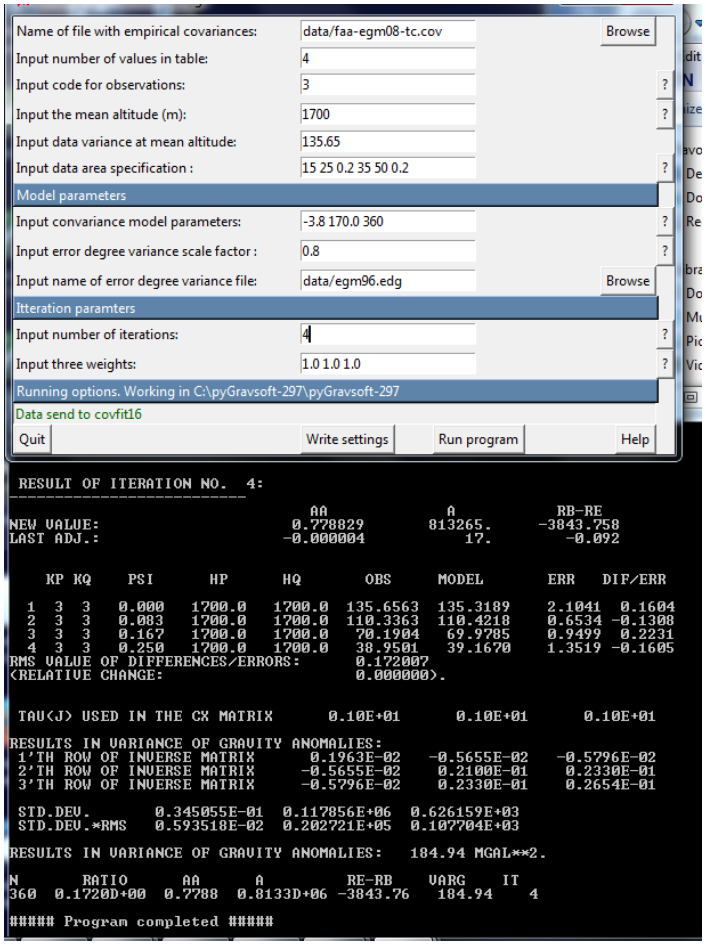
(6) estimate empirical covariance function.



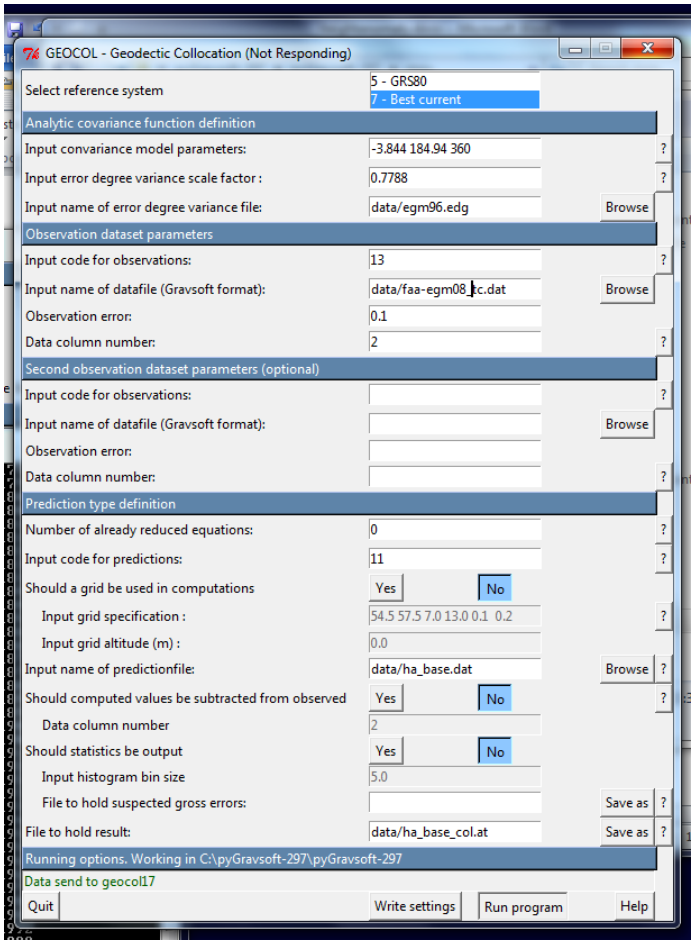
And with different sampling:


Input data filename:
data/faa-egm08_tc.dat
Browse
Input position of data element: :
2
Input sample intervalsize (arcmin):
5.0
Input number of sampling intervals:
20
Configure parameters
Should mean value be subtracted:
Yes
No
Should data in subarea be used:
Yes
No
Input area boundaries:
54.5 57.5 7.0 13.0
Input histogram bin size
5.0
Name of file to hold result:
data/faa-egm96-tc.cov
Save as
Running options. Working in C:\pyGravsoft-297\pyGravsoft-297
Data send to empcov
Quit
Write settings
Run program
Help
C:\Python27\python.exe
2196 VALUES INPUT FROM FILE data/faa-egm08_tc.dat
DATA FROM 16.4167 23.9612 39.0533 45.5208
MEAN HEIGHT= 770.3 M
DATA PER DEG.SQUARE = 48.0 MEAN LINEAR SPACING 0.144 DEG.
NUMBER OF OBS 1= 2196 MEAN = -2.5878 VAR. = 116.3068166
HISTOGRAM, USING BIN SIZE= 5.000
0 2 1 2 2 10 17 33 90155368870286203 93 41 13 4 2 1 1 1 1
OUT-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9' 10OUT
0 2 1 2 2
10 17 33 90 155
368 870 286 203 93
41 13 4 2 1
1 1 1
PSI COVA(1, 1) PROD. STDV OF COV..
O M (UNIT)**2 NUMB (UNIT)**2
0 0.00 135.656278 3948 3.2 9.696980
0 5.00 110.336331 13841 1.3 55.237416
0 10.00 70.190426 19154 1.0 72.143462
0 15.00 38.950098 20148 0.9 85.260580
0 20.00 23.066655 21301 0.8 90.160375
0 25.00 9.395685 23960 0.8 98.380887
0 30.00 5.525026 26308 0.8 102.934874
0 35.00 3.219624 28884 0.7 104.325239
0 40.00 5.563448 32577 0.6 101.970053
0 45.00 3.000713 35094 0.6 103.428744
0 50.00 2.764135 36162 0.6 104.484792
0 55.00 0.048330 38177 0.6 106.634915
1 0.00 1.115236 39774 0.6 106.016401
1 5.00 1.288179 39441 0.6 107.639518
1 10.00 2.618105 39390 0.6 107.049112

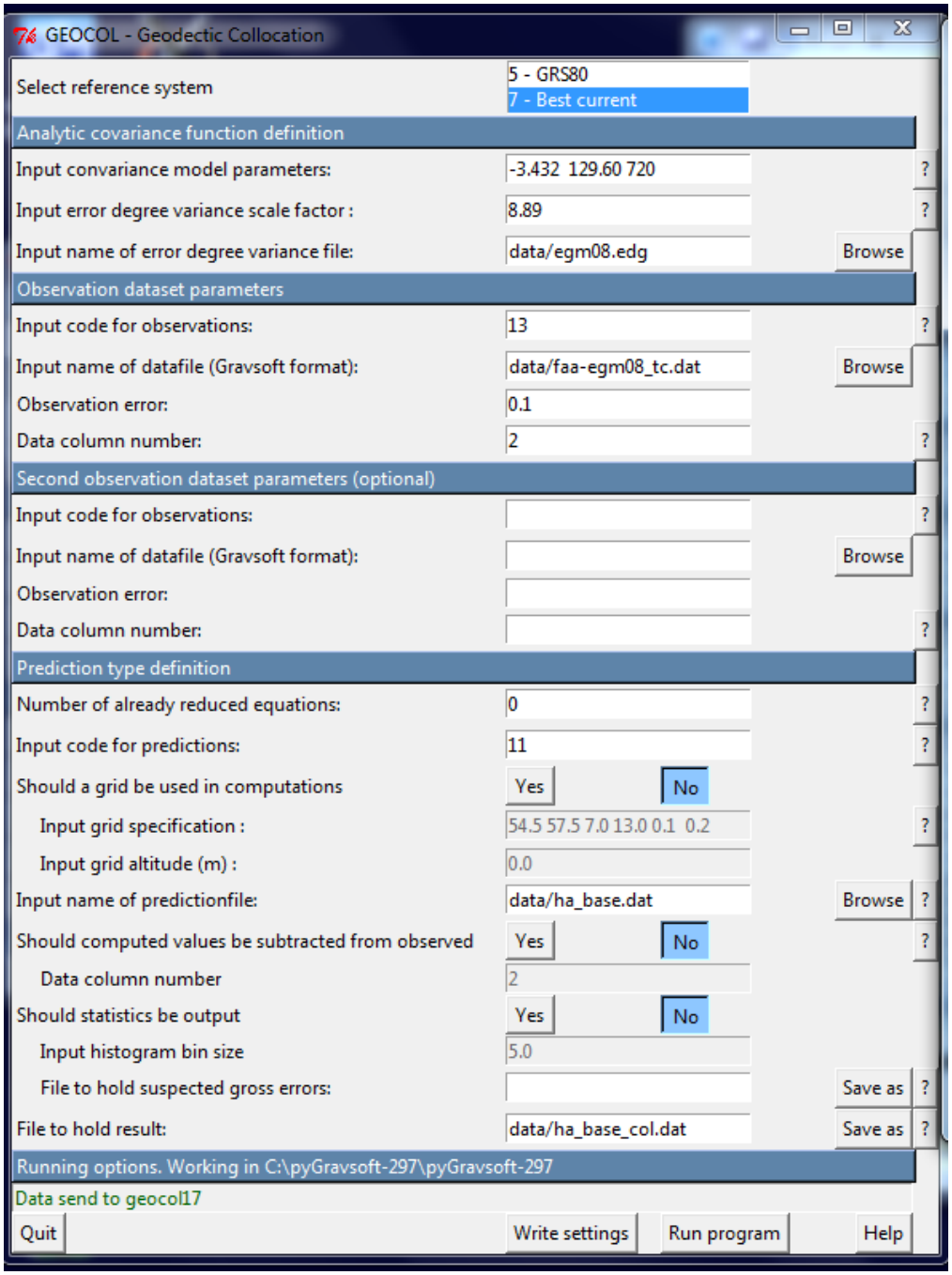
The covfit:


Name of file with empirical covariances:
data/faa-egm08-tc.cov
Browse
Input number of values in table:
4
Input code for observations:
3
Input the mean altitude (m):
1700
Input data variance at mean altitude:
135.65
Input data area specification :
15 25 0.2 35 50 0.2
Model parameters
Input convariance model parameters:
-3.8 170.0 360
Input error degree variance scale factor :
0.8
Input name of error degree variance file:
data/egm96.edg
Browse
Itteration paramters
Input number of iterations:
4
Input three weights:
1.0 1.0 1.0
Running options. Working in C:\pyGravsoft-297\pyGravsoft-297
Data send to covfit16
Quit
Write settings
Run program
Help
RESULT OF ITERATION NO. 4:
AA A RB-RE
NEW VALUE: 0.778829 813265. -3843.758
LAST ADJ.: -0.000004 17. -0.092
KP KQ PSI HP HQ OBS MODEL ERR DIF/ERR
1 3 3 0.000 1700.0 1700.0 135.6563 135.3189 2.1041 0.1604
2 3 3 0.083 1700.0 1700.0 110.3363 110.4218 0.6534 -0.1308
3 3 3 0.167 1700.0 1700.0 70.1904 69.9785 0.9499 0.2231
4 3 3 0.250 1700.0 1700.0 38.9501 39.1670 1.3519 -0.1605
RMS VALUE OF DIFFERENCES/ERRORS: 0.172007
(RELATIVE CHANGE: 0.000000).
TAU(J) USED IN THE CX MATRIX 0.10E+01 0.10E+01 0.10E+01
RESULTS IN VARIANCE OF GRAVITY ANOMALIES:
1'TH ROW OF INVERSE MATRIX 0.1963E-02 -0.5655E-02 -0.5796E-02
2'TH ROW OF INVERSE MATRIX -0.5655E-02 0.2100E-01 0.2330E-01
3'TH ROW OF INVERSE MATRIX -0.5796E-02 0.2330E-01 0.2654E-01
STD.DEV. 0.345055E-01 0.117856E+06 0.626159E+03
STD.DEV.*RMS 0.593518E-02 0.202721E+05 0.107704E+03
RESULTS IN VARIANCE OF GRAVITY ANOMALIES: 184.94 MGAL**2.
N RATIO AA A RE-RB VARG IT
360 0.1720D+00 0.7788 0.8133D+06 -3843.76 184.94 4
Program completed

LSC:



Now using egm08 error-degree variances:



After this all effects have to be added.