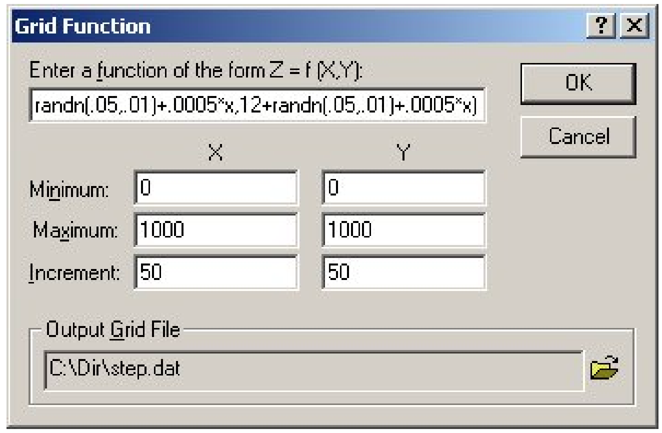
**Terrain Corrections – making terrain with SURFER, calculating corrections**

- All of the following must go on in the same subdirectory so put ***Hamxyz2.exe***, ***Hammer.con***, ***Step.grd***, and ***Step.dat***, ***my_pts.dat*** all in one subdirectory as you make them.

- Create some topography in Surfer's ***Grid Function*** (step.grd) (x: 0 -> 200; y: 0-> 200, step size = 5; function is: { z=IF(x>100,2+randn(.05,.01)+.0005*x,12+randn(.05,.01)+.0005*x)}. This example gives you a 10 meter step in a low-dipping ramp with a little noise. From the Bouguer slab correction (.11195 mgal/meter) you expect a terrain correction of about 0.56 mgals near the step for this semi-infinite slab.




- Use ***Grid Node Editor*** to save the topography as an ASCII (x,y,z), ***step.dat***

- Create the appropriate ***Hammer.con*** control file:

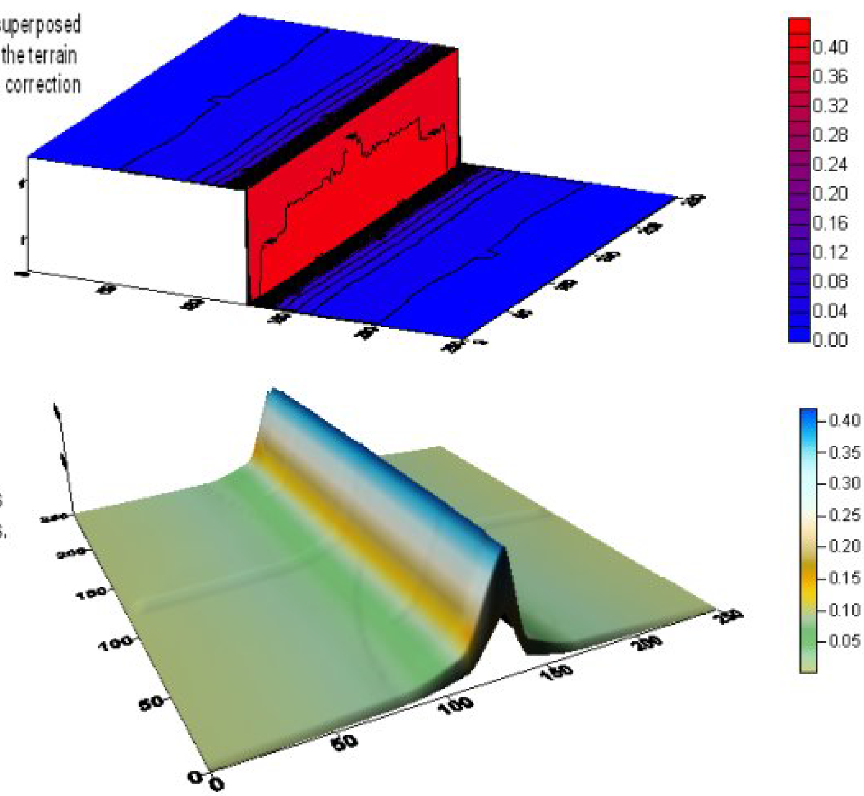
```
c:\dir\step.dat
M M M
2.67
M
4
4 2  17
6 53
6 170
8 390
```

This takes terrain out to 390 meters into consideration; there will be zeros beyond the area of our terrain because of the equation we used to make the terrain. NOTE – some Windows OS' are sensitive to file/directory names with greater than 8 characters. Thus your file may be "*C:\Dir\Geophy~1\Grav*" of a file name allMyD~1.dat instead of *allMydatafrom Eastof the NorthHills.dat"d*

- Typically, at this point, you would also have a file of points you wanted terrain corrections for. We will calculate terrain corrections for all the points in the topographic file. To do so:
  - In Surfer's ***Worksheet***, open ***step.dat***
  - Put in a row, at the start, with the number of points (441 for this example; start at X=0, Y=0 and get points right on the cliff)
  - The first three columns will be *X, Y, Z*, add a fourth column and fill it with station numbers (I cut and pasted that column from Excel)
  - Save the file, as ***My_pts.dat***, in space-delimited format

- In a subdirectory which includes: ***Hamxyz2.exe***, ***step.dat***, ***Hammer.con***, and ***my_pts.dat***, issue the DOS command:
    - hamxyz2 ***my_pts.dat*** DataOut.dat > infoDump.dat
- DataOut.dat now has scrambled X, Y coordinates along with the terrain corrections associated with the proper station number. Cut and paste the terrain corrections back to your spreadsheet/worksheet, grid them and take a look.

For the figure below, I used a station spacing of 1 meter – that gives lots of points and takes half an hour to run on my computer. The larger the spacing, the smaller the maximum value of the terrain correction because not as much nearby terrain is considered (think about sampling theory). With a really small spacing (0.1 meters?), your terrain corrections right at the step should approach the theoretical value of 0.55 mgals {0.5 * 10 meters * 0.11195 mgal/meters; the 0.5 is because we have half of an infinite slab}.




The upper image shows colored terrain corrections superposed on the terrain. Thus as you get further from the cliff, the terrain correction falls off dramatically. Note that the terrain correction is the same for both the upper and lower plateaus.

The lower image shows colored terrain corrections versus position. The 10 meter cliff is at 125 meters.