

SURFER Grids from Excel (or any other program)

SURFER's grid structure is pretty simple. It is easy to use Excel, or many other applications, to write **SURFER** files. For example if you completed the erosion by diffusion problem given in the auxiliary problems, you have an n_row by m_column matrix (holding elevations as a function of time and distance) of elevation values that you could plot in **SURFER**. In any case where you are computing x, y, z data, **SURFER**'s grid format is a good choice for your output.

SURFER uses either ASCII (plain text) files or their own binary grid format. The quickest way to get 2D data from Excel to **SURFER** is to write those data in the ASCII format. **SURFER**'s file format is:

```
DSAA
Ncolumns      Mrows
Xmin          Xmax
Ymin          Ymax
Zmin          Zmax

Row 1:  Z11  Z12  Z13  ...  Z1n
Row 2:  Z21  Z22  Z23  ...  Z2n
Row 3:  Z31  Z32  Z33  ...  Z3n
...
Row M:  ZM1  ZM2  ZM3  ...  ZMn
```

That is,

The first line just holds the ASCII (text) string "DSAA".

The second line is (integers) the number of rows and number of columns

The third is the minimum and maximum x values

The fourth is the minimum and maximum y values

The fifth is the minimum and maximum z values (use Excel's MAX() and MIN() functions)

Now comes, row after row, the Z values in the grid. In **SURFER**'s reckoning, the first row is the one associated with the minimum value of y. **The first row is the bottom edge of your map and the last row is the top edge of the map.** The leftmost value in each row is that associated with the minimum x, the rightmost goes with the maximum x.

Thus, an ASCII **SURFER** file looks like this:

```
DSAA
 11      20
 0       1
 0       1.9
-1.000  0.989
 0.95   0.72   0.92   0.70  -0.55   0.99   0.38  -0.54  -0.96  -0.96  -0.76
 0.72   0.75  -0.91  -0.29  -0.72   0.19   0.96   0.12  -0.68  -0.99  -0.94
 0.92  -0.91   0.91   0.32  -0.54  -0.23   0.99   0.49  -0.39  -0.89  -1.00
 0.70  -0.29   0.32   0.69  -0.98   0.01   0.99   0.58  -0.25  -0.81  -1.00
-0.55  -0.72  -0.54  -0.98  -0.54   0.60   0.99   0.47  -0.28  -0.80  -0.99
 0.99   0.19  -0.23   0.01   0.60   0.99   0.80   0.20  -0.43  -0.84  -1.00
 0.38   0.96   0.99   0.99   0.99   0.80   0.37  -0.16  -0.63  -0.91  -1.00
-0.54   0.12   0.49   0.58   0.47   0.20  -0.16  -0.54  -0.83  -0.98  -0.99
-0.96  -0.68  -0.39  -0.25  -0.28  -0.43  -0.63  -0.83  -0.96  -1.00  -0.95
-0.96  -0.99  -0.89  -0.81  -0.80  -0.84  -0.91  -0.98  -1.00  -0.96  -0.87
-0.76  -0.94  -1.00  -1.00  -0.99  -1.00  -1.00  -0.99  -0.95  -0.87  -0.76
-0.48  -0.71  -0.85  -0.92  -0.95  -0.95  -0.93  -0.89  -0.82  -0.73  -0.61
-0.19  -0.43  -0.60  -0.70  -0.76  -0.77  -0.76  -0.71  -0.65  -0.56  -0.45
 0.06  -0.15  -0.32  -0.44  -0.51  -0.54  -0.54  -0.50  -0.45  -0.37  -0.27
 0.28   0.10  -0.06  -0.17  -0.25  -0.29  -0.30  -0.28  -0.24  -0.18  -0.10
```

0.46	0.30	0.17	0.06	-0.01	-0.06	-0.08	-0.07	-0.04	0.00	0.06
0.60	0.48	0.36	0.27	0.20	0.15	0.13	0.12	0.14	0.17	0.22
0.71	0.61	0.52	0.44	0.38	0.33	0.31	0.30	0.30	0.32	0.36

To construct a SURFER file using Excel:

- **Build and calculate your spreadsheet** so that you have a 2D grid of values. Again, the optional erosion by diffusion problem makes a good data set. Keep in mind that y increases down for **SURFER** so that the first row of data will be the bottom of your **SURFER** plot. Save your spreadsheet.
- Highlight and **copy the grid** of (x, y, z) values you want to plot.
- Open a **new worksheet**.
- Right click in cell A6, select **Paste Special, values**.
- You should have a sheet of data, not formulas.
- Insert the five rows of **SURFER**'s header as above

DSAA	
Ncolumns	Mrows
Xmin	Xmax
Ymin	Ymax
Zmin	Zmax

- Save the file as a tab delimited text file, use the extension .grd. Thus you might save your file as *my_SURFER.grd*. **SURFER** will make some comment about "... only saving the active sheet...". That's ok – that's the one you want to save.
- You should be able to open this file in **SURFER**'s map/contour menu. The figure to the right is an example from the erosion by diffusion exercise.

