

## Spatial Trend Surface Analysis

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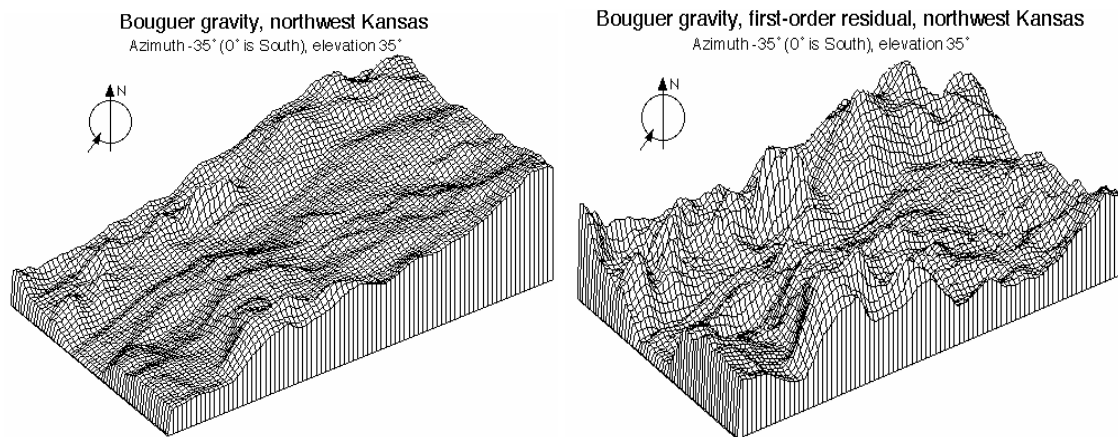
**Definition:** The concept of spatial trend surface analysis may be explained in terms of a sample of data observed in either a random or regular spatial pattern. The location of each point could be defined by a unique coordinate system,  $(x, y)$ . The variable of interest,  $z$ , is measured in every location. Thus, the sample consists of  $(x, y, z)$  that can be analyzed.

It is also possible the points are summary measures of the variable in a well-defined area immediately surrounding the  $(x, y)$  position. One can thus draw a three-dimensional solid with the height of the solid representing the value of the summary measure of variable  $z$  within the area.

Also, it is reasonable to suspect the outcome of  $z$  would be influenced by the adjacent areas. Thus, the solid height could blend into the surrounding ones so that the entire surface is relatively smooth. Summarizing the surface of the diagram is the goal of any spatial trend surface analysis.

### Application:

Spatial trend surface analysis is used widely. The figure below shows Bouguer gravity data from northwest Kansas. It is obvious that there is a strong west-to-east trend.



Data source: Kansas Geological Survey. <http://www.kgs.ku.edu/Tis/surf3/s3trend2.html>

### References/Sources:

- Hembd, Jerry, and Craig L. Infanger. 1981. An application of trend surface analysis to a rural-urban land market. *Land Economics*, 57(3):303-322.
- Parker III, Carl. 1981. Trend surface and the spatio-temporal analysis of residential land-use intensity and household housing expenditure. *Land Economics*, 57(3):323-337.
- Schroeder, L.D., and D.L. Sjoquist. 1976. Investigation of population density gradients using trend surface analysis. *Land Economics*, 52(3):382-392.

URL:

<http://www.kgs.ku.edu/Tis/surf3/surf3Home.html#1G>