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Dear Bob:

Upon your request, and a bit reluctantly, I went through the various notes of J. W. Merks. All these notes are similar in content sharing the same figures and examples. It seems to me that Mr. Merks' anger arises fro a misreading of geostatistical theory, or a reading too encumbered by classical "Fischerian" statistics. The following attempt at clarification addresses the three recurring points made in Mr. Merks' notes.

1. Data and degrees of freedom
2. Unbiased estimation of spatial variance
3. The smoothing effect of kriging

1 - Data and degrees of freedom

The very reason for geostatistics or spatial statistics in general is the acceptance (a decision rather) that spatially distributed data should be considered a priori as dependent one to another, unless proven otherwise. It is that spatial dependence which allows differentiated local interpolation and mapping in general. Were the data independent one from another then only global statistics can be retrieved. In presence of dependence the classical notion of degrees of freedom vanishes: n spatially dependent data do not provide n degrees of freedom.

It is not correct to state categorically that kriging, or for that matter any other interpolation algorithm, does not add any information to the system. It does through the implicit or explicit model of correlation. Indeed, change the variogram model yet keep the same data, the kriging estimates change. This correlation/covariance/variogram model can be borrowed from another field or outcrop, it is then genuine new information. Or, it can be inferred from the same data used for kriging. In the latter case, new information is introduced through aspects of the sample bivariate (two-point) distribution. The important question is, of course, how representative of the unsampled area is that bivariate information, i.e., how appropriate is the prior "decision" of stationarity.

2 - Unbiased estimation of the spatial variance

The reason for the denominator $(n-1)$ in the classical expression of the variance estimator

$$\mathrm{Var}^*\{Z\} = \frac{1}{n-1}\sum_{i=1}^{n}(Z_i - \overline{Z})^2$$