Assessing the mean stationarity condition in a geostatistical process

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1 General Information

When a physical phenomenon is modelled by geostatistical methodology it is generally assumed that it can be represented by a second order stationary continuous space process. It is under that assumption that the variogram is estimated in the traditional way proposed by Matheron, or using a robust estimator as the one suggested by Genton (1998). If the mean stationarity condition doesn't hold, the methodology can still be applied using some preliminary procedures like Median Polish, as recommended in Cressie (1993). But the assessment of the mean stationarity condition is based on subjective decisions, since usual statistical tests can not be applied with the individual realizations and the dependence structure of the process.

When the process is symmetric we propose the use of quantile regression framework to study the initial mean stationary condition. As under symmetry the mean of the process coincide with the median, it is formulated a statistical test in terms of the median considering the quantile regression model introduced by Koenker and Basset (1978). This approach has the advantage of dealing with non-i.i.d. assumptions and the quantile regression estimator can be thought as an adequate statistic for inferences on the mean process.

References

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