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MOVING-GEOSTATISTICS FOR AUTOMATED INTERPOLATION
APPLICATION TO ENVIRONMENTAL DATA

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Most geostatistical models usually used in the industry are variogram-based. However, when analysis and modeling of a global experimental variogram is involved, these models have two major shortcomings: they lack objectivity, and are often inaccurate. The lack of objectivity is a consequence of interpretation and fitting of an experimental variogram, even when done automatically. The lack of accuracy comes from the inadequacy between a global variogram model and the local structural characteristics of data.

Moving-GeoStatistics (M-GS) provides a set of techniques for optimizing locally the parameters involved in variogram-based models, especially structural parameters, such as ranges and anisotropy direction. Optimized parameters, adapted to the local structural characteristics of data, lead to better estimation and simulation results than those obtained by using global parameters deduced from a conventional structural analysis.

One of M-GS techniques is based on a local kriging cross-validation process. It involves determining locally the combination of variographic parameters that minimizes the cross-validation error. Consistency of the parameters can be improved by applying the process within overlapping windows.

This cross-validation technique, objective and free from any variogram interpretation, has been implemented into industrial software for mapping purpose. Environmental data available at a mesh of 100m x 100m are automatically estimated by ordinary kriging at a mesh of 10m x 10m. The quality improvement due to the technique, locally higher than 20%, is illustrated by comparing it to classical estimates for a real data set. Being automated and giving better mapping results, the technique is promising as it can be used in many interpolation processes.