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A step by step procedure for multivariate modeling

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In environmental sciences, it is very common to observe spatio-temporal multiple data concerning several correlated variables which are measured in time over a monitored spatial domain. In multivariate Geostatistics, the analysis of these correlated variables requires the estimation and modelling of the spatio-temporal multivariate covariance structure.

In the literature, the linear coregionalization model (LCM) has been widely used, in order to describe the spatio-temporal dependence which characterizes two or more variables. In particular, the LCM model requires the identification of the basic independent components underlying the analyzed phenomenon, and this represents a tough task. In order to overcome the aforementioned problem, this contribution provides a complete procedure where all the necessary steps to be followed for properly detect the basic space-time components for the phenomenon under study, together with some computational advances which support the selection of an ST-LCM.

The implemented procedure and the related algorithms are applied on a space-time air quality dataset.

Note that the proposed procedure can help practitioners to reproduce all the modeling stages and to replicate the analysis for different multivariate spatio-temporal data.