Some Models for Spatial Analysis of Compositional Data

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Compositional data are vectors of non-negative data representing parts or proportions of a whole. The intrinsic constraint induces a correlation and demands an particular algebra for handling the data analysis. In some applications data can be collected aiming to describe spatial patterns of the compositions. Statistical modelling should therefore combine spatial correlation and the intrinsic correlation of the compositions. Two proposals for model specification are presented within the context of motivating examples, together with the associated methods of inference. The first refers to fish stock assessment within the Portuguese cost with compositions given by the age structure of the population. The model combines a univariate geostatistical model for fish abundance with a compositional model for the age structure with inference relying on simulation methods. The second describes spatial patterns in soil fractions by means of a geostatistical multivariate model with a common component used to induce the covariance structure.