Analysis of serially correlated compositional sedimentary data

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Compositional data occur in a variety of disciplines. In a collaborative project, earth scientists are interested in chemical compositions of sediments at different depths and different locations. The intrinsic feature of compositional data is the unit-sum constraint, that is, the proportions sum to one. This constraint implies that the proportions are correlated and traditional statistical methods are not directly applicable. Logratio analysis, which transforms proportions into logarithm of ratios, is by far the most widely used method. In thhis work, we propose a new approach for compositional data, which also takes into consideration the serial correlation and distributional shape.

Keywords: Compositional data; unit-sum constraint; serial correlation; mixed model.