Symmetric Balances for Determining Pairwise Association Between Compositional Parts

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Abstract

The concept of symmetric balances has been introduced in Kynčlová and others (2017), and it allows to construct two balances that capture all relative information of two compositional parts of interest to the remaining parts. The resulting balances form orthonormal coordinates, and they can thus be used for analyses relying on the Euclidean geometry, starting from graphical inspection to correlation analysis, testing for uncorrelatedness, and robust estimation of association.

Based on real data, we will demonstrate that already graphical inspection of the balances provides interesting insights into the data: trends, groups, and associations can be revealed, and it can be instructive to link such findings to absolute information. In the context of geochemistry it turns out that correlations based on symmetric balances serve as a sensitive tool to reveal underlying geochemical processes.

References

Kynčlová, P., Hron, K., Filzmoser, P. (2017). Correlation between compositional parts based on symmetric balances. *Mathematical Geosciences*. To appear.