A Temporal Compositional Analysis of Water Quality Monitoring Data

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Abstract: End-member mixing analysis (EMMA) is a method in hydrology for attempting to understand the runoff sources in river catchments and involves determining relative proportions of constituent components using tracer data. We consider the case where there are no separate data available for the end-members, and develop a model for source distributions via non-linear regression on the tracer/flow rate relationship. We allow these source distributions to vary in time and apply the model to a data set from central Scotland comprised of weekly or fortnightly readings over eighteen years.

Keywords: compositional analysis; water quality; time series.