ABSTRACT

In this paper we review recent advances in Stable Isotope Mixing Models (SIMMs) and place them into an over-arching Bayesian statistical framework which allows for several useful extensions. SIMMs are used to quantify the proportional contributions of various sources to a mixture. The most widely used application is quantifying the diet of organisms based on the food sources they have been observed to consume. At the centre of the multivariate statistical model we propose is a compositional mixture of the food sources corrected for various metabolic factors. The compositional component of our model is based on the isometric log ratio (ilr) transform of Egozcue et al. (2003). Through this transform we can apply a range of time series and non-parametric smoothing relationships. We illustrate our models with 3 case studies based on real animal dietary behaviour.