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We study a family of stochastic processes in continuous time which take as values vectors with non-negative values adding up to 1, and propose them as useful models for compositional data that changes over time. These processes have Dirichlet marginal distributions.

Our main application is the modeling of ecosystems in which the population proportions of the different species change over time. Of special interest is the study of the composition of microbial communities, in particular the human microbiome, since it has important health implications and can now be studied quantitatively using high throughput sequencing. (Received January 20, 2015)