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A general mathematical framework for representing soil organic matter dynamics

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We present a mathematical framework that generalizes both previous decomposition models and recent ideas about nonlinear microbial interactions. The framework is based on a set of five basic principles: 1) mass balance, 2) substrate dependence of decomposition, 3) heterogeneity in the decomposability of SOM and transformations in the decomposability of SOM over time, 4) environmental variability effects on decomposition, and 5) energy limitation of decomposers. This framework generalizes the majority of SOM decomposition models proposed to date.