



Species sorting, apparent neutrality and lasting priority effects: palaeoecological lessons from an inherently dynamic natural ecosystem

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To assess the influence of long-term temporal processes in community assembly, we reconstructed the community changes of two dominant components of freshwater food webs, planktonic *Daphnia* water fleas and benthic chironomid midge larvae, in a fluctuating tropical lake through eight cycles of major lake-level fluctuation spanning 1800 years. Our results show a highly unpredictable pattern of community assembly in *Daphnia*, akin to neutrality, but largely dictated by long-lasting priority effects. These priority effects were likely caused by rapid population growth of resident species during lake refilling from a standing stock in a deep crater refuge, thereby pre-empting niche space for new immigrants. Contrastingly, chironomid larvae showed a more classical species sorting response to long-term environmental change, with more limited contribution of stochastic temporal processes. Overall our study emphasizes the importance of temporal processes and niche pre-emption in metacommunity ecology, and suggests a important role for mass effects in time. It also emphasizes the value of paleoecological research to improve understanding of ecological processes in natural ecosystems.