

**Reworking diversity: Effects of storm deposition on evenness and sampled richness,
Ordovician of the Basin and Range, Utah and Nevada, USA**

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ABSTRACT

Storm-generated event beds are an important source of paleoecological information, especially in Paleozoic strata. Storm deposition and subsequent physical and biological modification can potentially alter the diversity structure of death assemblages significantly. To examine the effects of storm deposition on fossil assemblage composition, storm beds are compared with co-occurring beds representing background sedimentation in 67 samples from six Ordovician mixed carbonate-clastic units deposited above the maximum storm wave base. In the great majority of pairwise comparisons, evenness and sampled richness are higher in storm beds than in background beds. This effect is not explained by differences in lithification, skeletal fragmentation, or in the proportions of aragonitic or multielement skeletons. The elevated diversity of storm beds can result from homogenization of fine-scale faunal patchiness preserved in background beds or may be due to taphonomic feedback. The relative importance of these two end-member scenarios can be evaluated with detrended correspondence analysis. In shallow, carbonate-dominated environments, the former appears to predominate, while the latter is more important in a deeper setting dominated by fine-grained clastics. The disparity between background beds and storm beds suggests that, at least in the Lower Paleozoic, background beds may record a higher-resolution paleoecological signal while storm beds record a more complete census of alpha diversity. Because post-Middle Ordovician increases in the depth and intensity of bioturbation may have diminished the temporal resolution and increase the faunal completeness of background beds, this disparity is not necessarily expected in younger strata.