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Paleoecological dynamics of Furongian (late Cambrian) trilobite-dominated communities from northwestern Argentina

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ABSTRACT

The Cambrian–Ordovician boundary interval is a critical moment in the ecology of trilobite communities. To understand this transition, we studied—at three different spatial scales—changes in the structure of olenid-dominated communities included in the *Parabolina* fauna, which flourished in the latest Cambrian, largely storm-dominated, successions of northwestern Argentina. At the local (~meter) scale, species-poor communities occur in shoreface deposits. Relatively flat species-abundance distributions (SADs) and high evenness characterize upper offshore to offshore transition settings of the early highstand systems tract (HST), whereas uneven SADs in species-poor communities are typical of the lower offshore and shelf environments of the transgressive systems tract (TST). This pattern is unlikely to be caused by a change in time averaging and is consistent with the intermediate disturbance hypothesis predicting unimodal diversity gradients. The pattern is thus interpreted to be related to a trend in intensity and frequency of storm disturbance along local shallowing-upward gradients. At the regional scale (~100 km), the diversity trend across the sampled west-east transect is rather variable and does not match the depth or oxygen-related gradients. At the biogeographic scale, the patterns of abundance of two key taxa (*Parabolina* and *Asaphellus*) show contrasting abundance and occupancy patterns between the Cordillera Oriental siliciclastic settings and the more carbonate-rich settings of Famatina (Argentina) and Oaxaca (Mexico). The presence of these genera in settings spatially adjacent, but environmentally different from their preferred habitats can represent a signature of source-sink dynamics. Low sample evenness values for the Cordillera Oriental contrast with those of coeval Laurentian communities, implying that a secular increase in evenness took place earlier in Laurentia than in Gondwana.