



Late Ordovician, deep-water *Foliomena* brachiopod fauna from Cellon, Carnic Alps

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A hitherto unreported low-diversity brachiopod fauna from upper Katian (middle Ashgill) strata in the Cellon section, Carnic Alps includes species of the following small and thin-shelled genera: *Christiania*, *Dedzsetina*, *Leptestiina*, *Kozlowskites* and *Skenidioides*. Together these taxa belong to the widespread, deep-water *Foliomena* fauna that occupied circum-cratonic habitats during the Late Ordovician. Multivariate analyses of distributional data for the *Foliomena* and related faunas from 30 localities, globally, through the early Sandbian to late Katian interval, place the Cellon fauna within deeper-water, marginal biofacies; not surprisingly the fauna is placed adjacent to the late Katian faunas from the Králův Dvůr Formation, Czech Republic and the Domusnovas Formation, in Sardinia but it also has links to assemblages on the Baltic and Laurentian margins together with South China. The new assemblage confirms the persistence of deep-water facies in this part of the Carnic Alps during the late Katian, and develops further the evolutionary and geographical patterns of the *Foliomena* fauna around the margins of Gondwana.

Phosphatic preservation in the lower Cambrian Comley Lagerstätte of England: implications for Orsten-type taphonomy and the evolutionary history of small shelly fossils

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Early diagenetic phosphatization of embryos and small, non-mineralizing metazoans provides a unique window onto evolution across the Proterozoic–Phanerozoic transition. However, a poor understanding of the underlying taphonomic mechanisms limits the palaeobiological inferences that can be drawn. We describe the modes of phosphate occurrence within the lower Cambrian Comley limestones of England, including the horizon that yields exceptionally preserved soft parts of small phosphatocopine arthropods. Our re-excavation of a classic locality combined with petrographic and energy-dispersive x-ray analysis has allowed a new, high-resolution reconstruction of the Comley succession, while extensive new collections of microfossils have revealed a preservational spectrum with implications for the depositional and post-burial environment. We find that the shallow depositional setting of the Comley sequence is comparable to that of the embryo-bearing facies of the Doushantuo Formation (Neoproterozoic, China), although the style of phosphatization is closer to that of the arthropod-dominated, quiet-water Orsten deposits from the middle to late Cambrian of Sweden. Our results demonstrate that exceptional phosphatic preservation need not be associated with extensive secondary phosphatization of sediments or skeletal fossils, and we suggest that the degree of winnowing is a key factor in determining the composition of phosphatized assemblages. In addition, the diverse Comley microfossil assemblage emphasizes the preservational non-dependence of many