

A graptolite taphofacies model.

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Graptolite-bearing carbonate concretions from the Cape Phillips Formation, Arctic Canada, yield valuable biostratigraphic information, making the creation of a graptolite taphofacies model possible. The concretions lithified during shallow burial before extensive physical compaction, preserving the three-dimensional nature of the graptolites and the sediment. The method of layer-by-layer dissolution enables the examination of the orientation, preservational condition and small-scale lateral and vertical heterogeneity in graptolite distribution within single bedding planes and through successive strata. The model relates the evidence of biostratigraphic reworking and the vertical variability in graptolite distribution to the lithology of the laminae in which they occur in an attempt to define the palaeoecological and

taphonomic processes that acted on the fossils. We define 5 graptolite taphofacies; mass transport, sediment starved, in situ lag, graptolite bloom, and constant sediment and graptolite input. Chi square analyses of 15 concretions revealed that 7 displayed an even distribution of graptolites on the measured layers and 8 showed a concentration of graptolites on one or more layers (5% level of significance). We observe the range of taphofacies in the 15 concretions, with approximately 80% of the concretions plotting in or near the taphofacies of constant sediment and graptolite input. This graptolite taphofacies model provides a framework for the interpretation of the taphonomy of graptolites in wide variety of depositional settings and preservational styles.