TAPHONOMY OF DEVONIAN CONULARIIDS (CNIDARIAN) REVISITED: NEW PERSPECTIVES FROM THE SEDIMENTARY PETROGRAPHY

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Taphonomy of Conulatae (extinct cnidarian) is well known from recent proposed taphonomic models, which are based on the occurrences of the Ponta Grossa Formation, Devonian, Paraná Basin. The basic assumption of these models is that some conulariids that are inflated (with rectangular transverse cross section), non-fragmented, and vertically oriented to bedding in massive or laminated siltstones are *in situ* occurrences, preserved in obrution beds (storm beds). Otherwise, horizontally oriented conulariids with inflated thecae, found in close association with brachiopod-dominated pavements or with hummocky cross stratification are interpreted as parautochthonous to allochthonous records where the thecae were disrupted from their original vertical life position. Because conulariid thecae are fragile and flexible, their preservation as three-dimensional, non-fragmented thecae may imply on their pre-fossilization prior their final burial. In this context, the aim of this study is detail the taphonomic history through petrography analysis of the sediments that are infilling the thecae and of their matrix. Following standard petrographic methods, conulariid specimens that were the source of data for the previous taphonomic models were impregnated with plastic resins and sectioned (0,3mm). The grain orientation, sedimentary structures (laminations, bioturbations and concretions), mineralogical composition (area, percentage of each mineral), average apparent maximum grain size (AAMG), and granulometric sorting classes were

determined. The mineralogical percentages and the AAMG values by textural component were obtained directly through Leica Q-win image analysis software. Conulariids interpreted as preserved *in situ* occur filled by silts with 39.5% phyllosilicates (AAMG 0.04mm), 33.8% quartz (AAMG 0.03mm), and 0.2% feldspars (AAMG 0.03mm). These composition and texture is very similar to the rock matrix. In some specimens, however, bioclasts (closed articulated bivalve shells) are also found infilling the *in situ* conulariids. These bioclasts are infilled by sand grains, mainly quartz (51.5%, AAMG 0.08mm), phyllosilicates (40.8%, AAMG 0.07mm) and feldspars (7.6%, AAMG 0.12mm). Thus, the sediment that fill the bivalve shells is distinct of that infilling the conulariids thecae. Conulariids that are horizontally oriented to bedding are filled by sediments analogous to that are infilling the vertically oriented specimens, but their matrix is distinct, particularly as for the apparent absence of feldspar and the coarser AAMG values (quartz 0.06mm; phyllosilicates 0.08mm). These data indicate that: (a) closed articulate bivalve shells that are infilling the thecae of some conulariids are pre-fossilized bioclats, indicating different taphonomic histories; (b) horizontal conulariid specimens preserving the three-dimensional morphology that are associated to more energetic sedimentary structures (e.g., hummocky cross-stratification) are also pre-fossilized specimens that were reworked, and disrupted from their original vertical position, during storms, and (c) the sediment infilling the vertical *in situ* conulariid thecae and the matrix are not essentially distinct, suggesting a similar provenance, probably suspended, fine-grained sediments, associated to muddy clouds generated during storms.