STATE OF THE ART AND FUTURE DIRECTONS OF THE STUDY OF HARD-SUBSTRATE COMMUNITIES IN THE EARLY CRETACEOUS OF THE NEUQUÉN BASIN

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Hard-substrate communities of the Early Cretaceous marine units of the Neuquén Basin (Argentina) were confined to benthic islands, mostly invertebrate shells and inorganic nodules. Since 2008, study cases from the uppermost Vaca Muerta Formation, the marine facies of the Mulichinco Formation, and both marine members (Pilmatué and Agua de la Mula) of the Agrio Formation have been studied; materials are deposited in Repositorio del Área de Paleontología, Departamento de Ciencias Geológicas, Universidad de Buenos Aires and Museo Provincial de Ciencias Naturales "Dr. Prof. Juan A. Olsacher". Trigonioids were studied from the Vaca Muerta and Mulichinco formations and the Pilmatué Member; their paleoecological homogeneity allowed to evaluate how sclerobiont communities changed across the Valanginian. Through second-order sea-level cycles, trigonioid sclerobiont communities experienced minimum changes, mainly shifts in the abundance ranks of taxa. However, oyster dominance receded at transgressive systems tracts, coinciding with the lack of oyster mass accumulations at those times; this allowed recognition of a source-sink dynamics between benthic islands and oyster mass accumulations. From the Pilmatué Member, pectinids, gastropods, sponges and cephalopods were also studied. While a number of sclerobiont taxa are common among these basibionts, bivalves, gastropods and sponges each presented at least one taxon that is exclusive to them. The sclerobiont communities of cephalopods lacked unique taxa. This was due to cephalopods providing unstable conditions for their sclerobionts, given their nektonic habit and necroplanktonic drift. Thus, they were colonized only by the most adaptable taxa. For the Agua de la Mula Member, study cases so far include several coral species, and calcareous nodules. Corals thrived in specific environmental settings, and provided, as a substrate, very different conditions from mollusks; thus, dynamics and, in part, taxonomic composition of their sclerobiont communities differ. Because of this, comparison of sclerobiont communities among the Agua de la Mula Member and the older units is hindered by the very different paleoecology of the basibionts studied. Finally, hard inorganic substrates are represented by calcareous nodules from the Agua de la Mula Member. Taxonomically, their sclerobiont fauna has many taxa in common with those from invertebrate shells, but also some exclusive elements. Interestingly, cyclostome bryozoans, which are recorded in all other study cases, are absent from the nodules. While there is still a long way to go, this far, sclerobiont communities exhibited the following common features: pronounced exogyrid oyster dominance, a majority of solitary sclerobiont taxa, few to no interspecific interactions and minor taxonomic turnover across time. However, at least two sclerobiont groups (oysters and serpulids) were able to occasionally experience population bursts and conform bioherms. Thus, benthic islands likely acted as an important reservoir of these and other sclerobiont taxa stock. Most of the latter were generalists capable of adapting to a variety of substrates and settings, but some were restricted to certain environments or basibionts. These patterns will hopefully be further elucidated through the incorporation of further study cases and through the study of the oyster and serpulid build-ups and the environmental conditions that triggered their development.

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