Micrite from the Late Carboniferous bioconstructions in southern Guizhou, South China: characterization, origin, and role

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Abstract

The origin of micrite as a part of the "carbonate factory" is significant in revealing the formation of carbonate rock and the biocommunity in bioconstructions. Although micrite is common in bioconstructions, there is still controversy about the types and origin of micrite in reef facies. The study area around Houchang town (southern Guizhou, South China) was located at the margin of a carbonate platform in the Late Carboniferous, well-known for numerous and various bioconstructions including coral reef/biostrome, phylloid algal reef, microbial mound, and *Tubiphytes* reef, which provide ideal objects for studying the micrite in the reef facies. Based on the detailed observations of the field, polished slabs, and thin sections, four types of micrite related to biota can be identified according to the origin: micrite baffled by skeletal organisms (BM-1), micrite bound by binder guild (BM-2), micritization of bioclastic (BM-3), and the micrite formed by microbes (BM-4). Type BM-1 formed by baffled are observed around the skeletal organisms (corals and phylloid algae), which baffle the micro-sediments in the water flow. Type BM-2 commonly distribute around the binder represented by *Tubiphytes*, cyanobacteria, sessile foraminifers, and bryozoans. The binder together with micrite BM-2 could form clots including microspar and microbioclastics. Type BM-3 most occur in the bioclastic wackestone and results from the breakdown of previously micritized shells of benthic organisms. The micritization weakened the shells, promoting their breakdown and abrasion to form peloids composed of micrite. Type BM-4 is formed by microbial calcification as well as induction, manifested as micrite crust, irregular layers of encrusters, and microbial peloids. By analyzing the link among the depositional environment of bioconstructions, reef-building organisms, and micrite related to biota, suggests that sediment input, type of framework builder, and wave energy play a vital role in the origin of micrite in the reef facies. Type BM-1 in the skeletal reefs could provide shelter for benthic dwelling organisms, enhancing the biodiversity of reefs and the stability of the reef ecosystem. For non-skeletal reefs, the BM-2 can be the framework to support the formation of reefs like *Tubiphyes* reef. The microbial mounds in the study area mainly compose of BM-4 contributing to the framework. The development of several micrite types is facilitated by the diversity of reef-builder. Further, the micrite could contribute to the growth of reefs in the study area, reflecting the crucial effect of micrite on the formation of reefs in the eastern Paleotethys Ocean during the Late Carboniferous.

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