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Molar Tooth Structures in China

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Molar Tooth Structures (MTS), which is a sedimentary structure made up of series of variously shaped voids and pygmatic cracks filled by unusual, equant microsparry calcites (5–15 μ m diameter) in Precambrian, were very well discovered in the Meso– to Neoproterozoic carbonates across China. MTS was recognized and named for the first time in China by Fairchild and others in 1997 [1]. In fact, they were found as early as 1980's in China. MTS in China are mainly developed within Mesoproterozoic and Neoproterozoic carbonates in the eastern North China, i.e., Jilin, Liaoning, Jiangsu, Anhui, Shandong, Henan, Hebei, Inner Mongolia and Tianjin, the southwest of Yunnan provinces of South China and Xinjiang, the Northwest of China [2].

Morphologies of MTS are highly diverse and are classified into two types, autochthonous and the allochthonous, and then subdivided into 13 categories in terms of the morphology of MTS and the relationship between the direction of MTS and orientation of contact surface of the surrounding host rock. Because of their complexity and diversity of morphologies, a variety of highly complicated morphologies of MTS have been poorly interpreted so far although up to 10 hypotheses have been suggested since the MTS was discovered initially. Nevertheless, the sedimentary environments (facies) of the MTS's formation are primarily subtidal through intertidal zones. The most important shallow tidal environment for creating MTS is the intertidal zone (rare MTS in the supratidal zone) and storm wave base of shallow subtidal zone is the deepest environment for MTS occurrences. MTS are most common in the fine–grained, tidal carbonate rocks characterized by the rhythmic alternation of micrites, muddy limestones and calcarenites.

Although MTS are globally distributed, they are mainly within the Meso– and Neoproterozoic with the exceptions of a few in the Paleoproterozoic to the latest Archean and developed in similar depositional environments to those in China.

Microscopic and the geochemical characteristics of MTS indicate that initial emergence and disappearance of MTS were not only influenced by changes in the chemical properties of the paleo–ocean, but also to atmospheric, climatic and organismal changes. MTS will help us to better understand global ocean chemistry, the depositional palaeogeography and reconstruction of the supercontinents (?).

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References:

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- [2] Kuang H (2014) *Journal of Palaeogeography*, 3(4): 359-383

