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Transitional carbonate facies from cool- to warm-water settings: A Permian case from the Baoshan Block in western Yunnan, China

Jin, X.C., Huang, H.

Institute of Geology, Chinese Academy of Geological Sciences, Beijing, China <jinxchi@cags.ac.cn>

The discrimination of cool-water carbonates from warm-water ones has broadened our understanding of the depositional setting for carbonate strata. The Baoshan Block in western Yunnan, China offers an opportunity to observe a unique carbonate facies which is transitional from cool- to warm-water settings. In this block, Early Permian limestones in the top of the Dingjiazhai Formation demonstrate mixed attributes of both cool-water and warm-water carbonates. These limestones are dominantly fitted bioclastic grainstone/packstone (Fig. 1), which is devoid of non-skeletal grains and contains diverse skeletal grains. Bioclasts comprise abundant bryozoans, echinoderms and fusulinids, as well as minor red algae, green algae and brachiopods. One remarkable feature of these limestones is the fitted fabric: many grain contacts are characterized by microstylolites. This probably results from compaction and pressure solution, due to the rareness of early diagenetic cements and micritic matrix. On the one hand, these limestones bear features of cool-water heterozoan association: 1) the dominance of eurytopic bryozoans and echinoderms, 2) the absence of non-skeletal grains, such as ooids or peloids, 3) the scanty early cementation and carbonate muds [1-2]. On the other hand, the admixture of fusulinids, although with rather low diversity, and rare green algae is distinct from typical cool-water carbonates, and show certain degree of warm-water signature. In the stratigraphic framework, these limestones are sandwiched between glacio-marine diamictites in the lower part [3] and, in the upper part, warm-water photozoan carbonates (e.g. oolites) and diverse fossils diagnostic for warm shallow marine, e.g. neoschwagerinids and verbeekinids of fusulinids [4]. Inasmuch as these facts, we interpret the limestones on the top of the Dingjiazhai Formation as a subtropical transitional type between cool- and warm-water carbonates. The recognition of this particular facies is of general significance for fulfilling the spectrum of carbonate facies types.

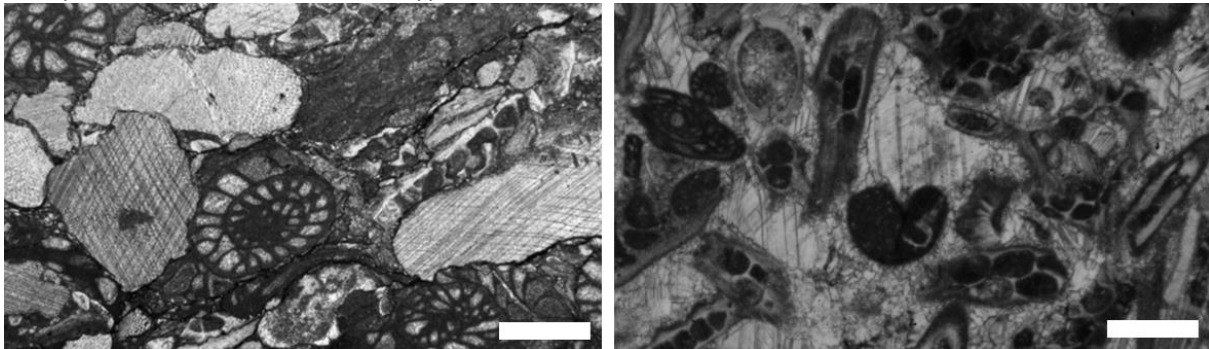


Figure 1: Facies photomicrographs of carbonates in the top of the Dingjiazhai Formation from the Baoshan Block in western Yunnan, China. (Scale bar=1mm)

References:

[1] James N (1997) In: *Cool-water Carbonates*: Tulsa, 1-20

- [2] Nelson C (1988) *Sediment Geol* 60(1-4): 3-12
- [3] Jin X (2002) *J Asian Earth Sci* 20(6):633-646
- [4] Huang H et al. (2015) *J Asian Earth Sci* (104):127-144

