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Sea-floor carbonate fans and calcimicrobial mound in the lower Triassic red limestone of the Alwa Formation, Baid Exotic, Eastern Oman Mountains.

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Abstract.

With the end-Permian mass extinction, a major crisis occurred in Phanerozoic carbonate systems. A non-skeletal carbonate factory abruptly replaced the prolific upper Paleozoic skeletal carbonate factory. Microbial communities emerged from stressed palaeoenvironments to recolonize normal marine areas.

At least three large microbial episodes spread throughout the giant carbonate platforms of central and eastern Tethys to South China during the prolonged Early Triassic recovery interval.

The third one, lower Olenekian in age, is mainly recorded by oolitic shoals and accessory stromatolites and edge-wise conglomerates on the carbonate ramp of the central tethyan margins (S Turkey, N and central Iran).

In Oman, this episode concerns a 30m thick unit of Smithian red ammonoid limestone (Alwa Formation of Hallstatt facies) belonging to the Baid Exotic (Permian to Cretaceous limestones and cherts) in the area of the Wadi Tayn (E Oman mountain). The mainly red colored Smithian limestones exhibit very peculiar features:

- up to 0.5m deep channels, filled up with clasts of middle to upper Permian shallow water skeletal carbonate supported by isopachous marine cement;
- several meters of gray calcimicrobial boundstone showing a clotted texture and fenestral fabrics filled up with coccoidal peloids;
- sheet cracks with a first generation of light isopachous marine cement;
- black sea-floor calcium carbonate fans showing up to 10cm long radiating acicular to bladed crystals.

This last texture is very similar to the younger (late Spathian) large sea-floor carbonate fans recorded in the upper Member of the Union Wash Formation at Darwin Hills (S California).

Highly variable carbon isotope values and excursions up to 2.5‰ characterize this unit. The carbon isotope response to microbial mediated boundstone and to sea-floor calcium carbonate fans will be analyzed and discussed.