

## SPONGE-MICROBIAL STROMATOLITES AND CORAL-SPONGE REEF RECOVERY IN THE TRIASSIC OF THE WESTERN TETHYS DOMAIN

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The Lower and Middle Triassic carbonate successions of the Western Tethys domain (Alps, Carpathians, Germanic Basin) comprise very particular sponge-microbial stromatolites that formed within the extremely shallow, perilitoral zone (Szulc, 1997). The stromatolites are capping emergent oolitic bars or form the lining of deep (up to 1.5m) karstic fissures. The stromatolites are composed of interfingered, microbial laminites and small (< 0.5 cm), lenticular sponge bodies. They display a variety of morphology, ranging between mm-thin flat laminites to 50 cm-thick columnar fabrics. Internal structures are relatively poorly preserved, nonetheless the dictyid Hexactinellidea seem to be the main sponge component of the Triassic stromatolites. The aphanitic and peloidal automicrite carbonate fabrics typical of the spongean-microbial association are also recognizable.

The Lower Triassic sponge-microbial stromatolites could be recognized as a “disaster form” enabling survival and recovery of the sponge buildups after the Permian-Triassic extinction. Regarding the paleoecological context of this interval of the Phanerozoic, the stromatolites represent a “Lazarus form.” These Lilliputian metazoan-bacterial buildups most likely enabled a survival and recovery of the reef-forming organisms after the P/T mass extinction.

In Middle Triassic times (Pelsonian), the hexactinellid sponges accompanied first by scleractinian corals gave rise to the oldest *in situ* reefs found in the Western Tethys province. The best developed Pelsonian sponge-coral buildups occur in Upper Silesia (Poland) where they form bioherms of some 2-80 meters across and several meters high (Szulc, 2000).

The sponge-coral buildups display a complex vertical succession typical of “catch up reefs” affected by the highstand, shallowing-upward trend in the basin. Generally, the buildup construction began with prostrate colonies of Hexactinellida sponges settled over subequal bioclastic dunes and formed thin (up to 3 cm) veneers perfectly mimicking disposition of the dune surface. The contribution of the sponge component grows upsection and they start to first form biostromal fabrics and afterward bioherms. With the further growth and relative shallowing, other organisms contributed to the reef community: crinoids, other species of sponges, brachiopods, serpulids, encrusting forams and scleractinian branched corals. The sponges and branched corals form domes and knobs clustered together. When the reef crest reached the surf zone, the encrusting corals (*Pamiroseris silesiaca*) became the main reef contributor typical of a highly turbulent environment.

The Silesian reefs developed within the storm wave zone and display a possible zooxanthellate association (Morycowa & Szulc, 2006).

### REFERENCES

- Morycowa, E. and Szulc, J. 2006. Remarks on Middle Triassic (Anisian) scleractinian corals from Cracow-Silesian region, Poland (Northern-Peri-Tethyan realm). Österreichische Akademie des Wissenschaftern., Schriftenreihe der Erdwissenschaftliche Kommission. 17: 421-433.
- Szulc, J. 1997. Middle Triassic (Muschelkalk) sponge-microbial stromatolites, diplopores and *Girvanella*-oncoids from the Silesian-Cracow Upland. In: 3<sup>rd</sup> Regional Symposium of International Fossil Algae Association and 3<sup>rd</sup> International Meeting of of IGCP 380, Guidebook & Abstracts, Cracow, p. 10-15
- Szulc, J. 2000. Middle Triassic evolution of the Northern Peri-Tethys area as influenced by early opening of the Tethys Ocean. Annales Societatis Geologorum Poloniae 70: 1-48