Ber. Inst. Geol. Paläont. K.-F.-Univ. Graz	ISSN 1608-8166	Volume 7	Graz 2003

PALAEOENVIRONMENTAL SIGNIFICANCE OF STROMATOPOROID SHAPES IN THE DEVONIAN OF THE HOLY CROSS MOUNTAINS, POLAND

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Stromatoporoid shapes and taphonomic attributes are widely considered to be valuable palaeoenvironmental indicators. Most of stromatoporoid external features are unrelated to taxonomy, which is based on the internal microstructure (pillae and laminae arrangement). KERSHAW & RIDING (1978) have introduced a parameterization method of stromatoporoid shapes, improved later by KERSHAW (1984), allowing a quantitative morphometric approach. This method has been applied for the Upper Devonian of the Holy Cross Mountains in Central Poland.

Stromatoporoids were measured in three localities: Karwów, Kadzielnia and Sitkówka-Kowala quarries (ŁUCZYŃSKI 1998). Quantitative analysis of the measurements demonstrated several differences interpreted in terms of ecological variations between the localities. The stromatoporoid assemblages from Karwów and Kadzielnia point to an environment with periodically accelerating deposition and water turbulence, whereas stromatoporoids from Sitkówka-Kowala indicate a calm setting with low deposition rate. The similarity of stromatoporoid assemblages from Karwów and Kadzielnia confirmed that dolomites exposed in the Karwów quarry represent the Kadzielnia-type reef mound deposits.

The Upper Devonian stromatoporoid- and coral-bearing limestones quarried in Bolechowice-Panek, located very close to Sitkówka Kowala in the Holy Cross Mountains, are widely used in Poland as decorative stones. The slabs exposed inside numerous public buildings in Warsaw provide an opportunity to observe a great number of vertical cross-cuts through stromatoporoids, allowing focusing on various biological and environmental factors that might influence stromatoporoid morphometric features (ŁUCZYŃSKI 2003). The stromatoporoid shape appeared to be strongly dependent on its size – the V/B ratio decreases along with increasing B. The relation can be well matched by a curve described by a formula: $f(x) = 5.7103x^{0.81633}$. The size of the measured specimens must be therefore taken into account in those studies of the stromatoporoid morphology, where it is concerned a palaeoenvironmental indicator. The stromatoporoids adopted several types of initial surfaces, corresponding to various growth strategies in the first phase of their growth in response to various environmental conditions, such as substrate consistency and sedimentation rate. Arrangement of latilaminae – internal growth-bands – well records the stromatoporoid growth history and therefore its studies are crucial in environmental interpretations, as the conclusions inferred from the shape alone might be very misleading.

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