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BRACHIOPOD TAPHOFACIES FROM THE LOWER JURASSIC OF MOROCCO: IMPLICATIONS FOR SHELL BED GENESIS

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Preservation of non-rapidly buried, autochthonous shell concentrations with brachiopods in life positions is a taphonomic dilemma, because an increase in shelliness is supposed to be positively correlated with a decrease in sedimentation rate. A 150 cm thick, densely packed, spectacular shell bed with terebratulid *Zeilleria rehmanni* in growth position from the Lower Jurassic (Sinemurian) of Morocco (Central High Atlas) shows a decrease in post-mortem alteration in contrast to shell-poor beds, in accord with the R-hardpart model and in contrast to the R-sediment model (KIDWELL, 1986). Independent evidence indicates that the increase in net hardpart-input rate is associated with an increase in sedimentation rate (rather than with a decrease in sedimentation rate). First, proportions of juveniles of *Z. rehmanni* are substantially higher in shell-poor beds than in the shell bed, indicating higher production of adult shells during the deposition of the shell bed. Second, size mode of *Z. rehmanni* is substantially higher in the shell bed than in the shell-poor beds, indicating their higher growth rate or higher longevity. Third, the micro-fabric and lateral replacement of the shell bed by shell-poor beds indicate that the shell bed grew in equilibrium with a sediment/water interface, indicating relatively continuous sedimentation rate on the scale exceeding the life span of several generations. Fourth, based on actualistic data from modern mussel and oyster shell beds, the suspension-feeding of a high-density population leads to high biodeposition rates through production of feces and pseudofeces which substantially exceed natural sedimentation rates. Extrapolating this into the fossil record, higher shell density should lead to higher biodeposition In addition, empty shells and inter-shell cavities preferentially trapped sediment in suspension. Both biodeposition and sediment trapping thus inevitably decreased rate of shell destruction, leading to stabilization, and protected the shell bed. This leads to the positive feedback between the increased hardpart-input rate and increased biogenic sedimentation rate, enhancing preservation potential of the shell bed. This study thus provides one possible answer for the long-standing question how shell concentrations can form by gradual accumulation on the sea-floor. As increase in production rate of shells leads to higher biogenic sediment trapping and biodeposition rates, this in turn leads to lower rate of shell destruction. Brachiopods can grow almost in equilibrium with a sediment interface as they also control burial rate.

Reference:

KIDWELL, S.M. (1986): Models for fossil concentrations: paleobiologic implications. - Paleobiology 12, 6-24.

WALDBRÄNDE IN PERM UND TRIAS: INDIKATOREN FÜR DEN ATMOSPHÄRISCHEN SAUERSTOFFGEHALT?

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Feuer sind heute ein integraler Bestandteil vieler terrestrischer Ökosysteme, vor allem in Gebieten mit einer oder mehreren ausgeprägten Trockenzeiten. Verschiedene Prognosen für