PALAIOS, 2007, v. 22, p. 372–383
Research Article
DOI: 10.2110/palo.2005. P05-096r

Graptolites as indicators of maximum flooding surfaces in monotonous deep-water shelf successions

Sven Egenhoff[1]* and Jörg Maletz[2]

[1]Department of Geosciences, 322 Natural Resources Building, Colorado State University, Ft. Collins, Colorado 80523-1482, USA; and [2]Department of Geology, State University of New York at Buffalo, 772 Natural Sciences and Mathematics Complex, Buffalo, New York 14260-3050, USA
e-mail: sven@warnercnr.colostate.edu

*Corresponding author.
Keywords: Ordovician, biosequence stratigraphy, outer shelf, Sweden

ABSTRACT

The graptolitic Early Ordovician succession of the Mount Hunneberg locality, southern Sweden, shows the response of graptolite faunas to sea-level changes. The exposed interval consists of intercalated carbonates and shales at the base, grading into pure black shales in its central and upper part. This facies trend records a deepening of the depositional environment due to an overall sea-level rise. The Mount Hunneberg graptolite fauna is dominated by nearshore, shallow-marine forms found in most layers throughout the succession. Deeper-water pandemic species occur only rarely together with shallow-water graptolites but are dominant at four distinct traceable levels at Mount Hunneberg. This change in graptolite faunal composition is interpreted to indicate sea-level fluctuations. With rising sea level, shallow-water endemics and pandemics migrated landward, and deeper-water pandemic graptolites became increasingly frequent on the shelf. During the peak of the transgression, deep-water forms dominated. With falling sea level, shallow-water forms again appeared and replaced the deep-water graptolites. The four levels with deep-water graptolites at Mount Hunneberg are, therefore, interpreted to represent maximum flooding surfaces. This study demonstrates that changes in the faunal composition of such planktic organisms as graptolites provide a promising tool for recognizing maximum flooding surfaces. As these faunal turnovers are also detectable in monotonous parts of the Mount Hunneberg succession, this biofacies-based approach enables the recognition of maximum flooding surfaces even when no lithologic changes are present, enhancing the applicability of sequence stratigraphic interpretations to monotonous outer shelf strata.