Geophysical Research Abstracts, Vol. 8, 08572, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08572

The occurrence of glaucony in the stratigraphic record: Distribution patterns and sequence-stratigraphic significance

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Glaucony has traditionally been used as an indicator of low sedimentation rate and represents one of the most reliable stratigraphic markers for transgressions. An integrated sedimentological, mineralogical and geochemical characterization of glaucony from 30 different European sections provides a comprehensive framework for the definition of its sequence-stratigraphic significance.

Severe restrictions to the practical use of glaucony in sequence stratigraphy are provided by a number of factors. These include: i) correct mineral characterization, ii) controversial sequence-stratigraphic interpretation of the host deposits, iii) distinction between in situ (autochthonous) and transported (allochthonous) glaucony, iv) identification of a hierarchy of glaucony-bearing depositional units.

Data from 244 glauconitic horizons document that spatial distribution of autochthonous glaucony follows predictable trends in abundance and maturity, showing a positive correlation between potassium content and the proportion of authigenic glaucony. This can enable differentiation of simple omission surfaces (containing less than 20% poorly mature glaucony) from major condensed horizons (20-50% mature glaucony) and mega-condensed sections ($>$ 50% highly mature glaucony). By contrast, glauconitic grains of allochthonous origin do not exhibit any peculiar trend in abundance and maturity, and a common feature is the occurrence of mature and highly mature glaucony in very small concentration.

In terms of sequence stratigraphy, simple omission surfaces may correspond to the transgressive surface, the maximum flooding surface or any parasequence boundary. These surfaces span intervals of time in the order of 10^4 years and have low correlation

potential. Major condensed horizons represent basin-wide stratigraphic markers that may bracket the TST/HST boundary ("condensed section"), but more commonly comprise the entire TST (10^5 years). Mega-condensed sections imply huge stratigraphic condensation, in the order of magnitude of an entire third-order depositional sequence (10^6 years), and are likely to be correlative on a global scale.

Transgressive-regressive patterns may be easily detected by the widespread occurrence of glaucony within thin transgressive sediments. As a consequence, the transgressive surface can be much more readily identified than the sequence boundary and T-R sequences, more than depositional sequences, regarded as useful tools for a pragmatic stratigraphical subdivision of glaucony-bearing deposits.