TREATING STRONGLY - LITHIFIED ROCKS WITH ULTRASONIC WAVES

Jorijntje Henderiks & Patrizia Ziveri, Geomarine Center, Vrije Universiteit, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands

A detailed calcareous nannofossil biostratigraphy has been established for the Cenomanian-Turonian of the Russian Craton Platform and the Crimean Peninsula, using the Cretaceous nannofossil zonation of Sissingh (1977) and modifications by Perch-Nielsen (1985). Quantitative and semiquantitative analyses of six sections created a biostratigraphical framework for palaeoenvironmental and palaeoceanographical interpretations. Results will be discussed in a separate paper, but we would like to make a short note on the methodology used during this study which might be useful to other nannofossil investigators who work with strongly-indurated rocks.

Strongly-lithified limestones from the Crimean sections proved to be barren of coccoliths after normal smear-slide preparation. Experiments were performed to obtain sufficient material from these limestones in a quick and easy way, as opposed to the laborious crushing and centrifuging technique, as described by Taylor & Hamilton (1982), or the crushing and decanting method described by Monechi & Thierstein (1985). It was found that treatment of rocks with convergent, high-frequency ultrasonic waves does not deleterously affect the small nannofossil fraction, and that sufficient nannofossiliferous material can be recovered by this method, if subsequently concentrated by centrifuging. So-called sonifiers are occasionally used in cleaning nannofossil material, but the frequency and strength of the ultrasonic waves is far less than used for this study.

Rock samples were placed into plastic bottles which were then filled with distilled, buffered water. The bottles were put under a Branson Sonifier 450. This machine, that can also be described as a ultrasonic 'disruptor', was operated for four minutes with the maximum output control (10) and a duty cycle of 70%. To check for the reliability of this method in keeping the small fraction intact, a comparison was made: smear-slides of a well-preserved, nannofossil-rich sample were prepared using both the 'normal' method (from a scratched rock-surface) and from an ultrasonic-waves preparation. No differences between the two preparations could be appreciated under the polarising light-microscope, and SEM images showed no differences in preservation, thus giving support for the non-destructive nature of this method. Under the SEM, samples treated with this method also showed intact coccospheres, giving additional support for the non-destructive character of the method with respect to the nannofossil fraction.

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