Diversity of foraminifera in turbidite-interturbidite sequences from the selected deposits of the Siary Subunit, Magura Nappe (Polish Outer Carpathians)

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Fine-grained deposits of a turbidite sequence from the Magura Beds have been selected for detailed analysis. Pelitic intervals within 40 cm thick turbidite packet displayed vertical changes. Olive-green, calcareous layers, which showed the features of turbidites, were alternating with darker ones, which could be assumed as non-turbiditic, hemipelagic layers. The main aim of the study was to examine this sequence in terms of its foraminiferal content.

In 22 of the studied 24 samples, deep-water agglutinated foraminifers of flysh type (DWAF) were dominating. The number of specimens varied within the samples from 25 to 3569. The studied assemblages displayed low diversity, up to 16 genera. Most samples confirmed the assumption, mentioned by Winkler (1984) that in hemipelagic deposits foraminifers are more frequent, compared to their occurrence in turbidites. However, in a few cases, deviation from this pattern has been observed. This fact points to more complicated origin for the pelitic intervals of the turbiditic sequence, than it has been assumed from the macroscopic observations. In this case, statistic analysis could be a useful tool.

For both genetic types of pelitic sediments, the number of each genera was added up and two data samples, called A and B, have been created. As both data populations are not showing normal Gaussian distribution, only non-parametric methods were used. At first, the Mann-Whitney U-test was carried out. The standard, fundamental hypothesis of this test is that the two populations are identical. Data from both A and B sets were taken jointly and put in an ascending order. Each value had been given a rank on the basis of which U values were calculated and final results obtained as follows. Given hypothesis cannot be rejected with $\alpha 0.10$ level of confidence. Under the assumption, that consecutive turbiditic currents came from same source area, the test result can be interpreted as there was no difference in the environmental conditions between the basin, from where currents originated and the basin of their deposition. It is also possible that foraminifer fauna was originally absent in transported sediments, but then was collected during the movement of the currents just before the deposition.

Another type of statistical method used in this study was the cluster analysis. It is a method of grouping data based on their similarity and presenting the results in a graphic form. R-mode clustering was used do discover, if there are any associations or patterns between the genera. In this approach, Euclidian distance was used as a measurement of taxonomic distance and then clusters were created by a single-linkage method. To present the findings, the cladogram style was chosen (Fig. 1.). *Dentalina* sp., *Psammosphaera* sp. and *Hyperamina* sp. are very close, but their number of specimen is very low and that could disturb the conclusions. The cluster layout confirms separation of the most frequent *Ammospheroidina* sp. and a tube-like taxa. Furthermore clustering showed, how distant occur from each other the rest of genera.

To do more advanced statistical analysis, more specific data is required. There are also more geological factors, which must be taken into consideration, in case if a more detailed environmental study based on statistical estimations is planned.
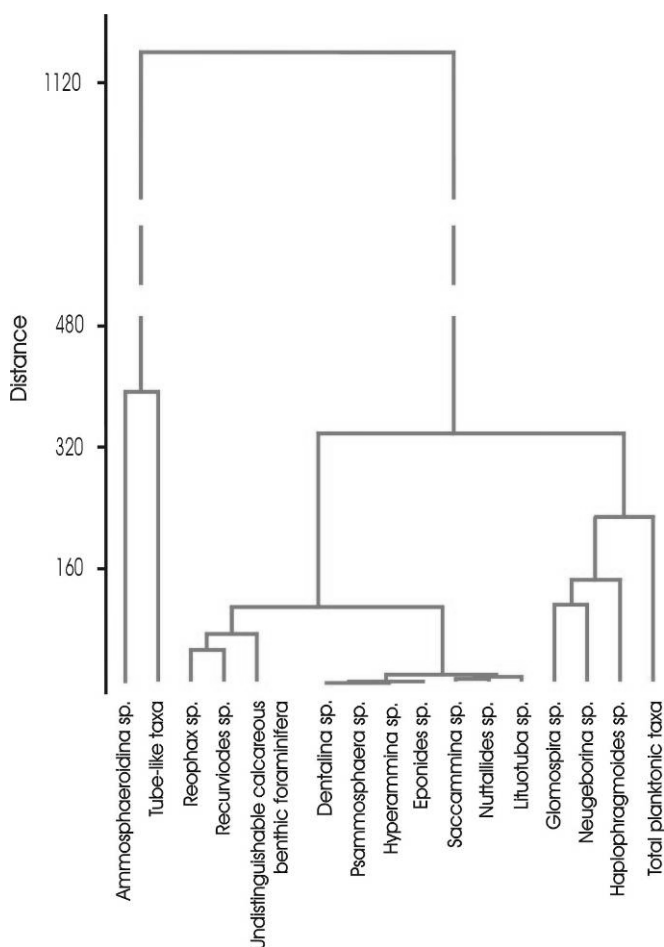

Fig. 1.: Relations between foraminifera fauna

Winkler, W. (1984): 2nd Int Symp Benthic Foraminifers: 611-617.