



Zonal subdivision of marine sequences: achievements and discrepancies

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It was 150 years ago when a notion of zone was introduced into stratigraphy. By the present time zonal units with a duration of 0.3-3.0 M.y. in average have been established virtually for all systems and stages of the Phanerozoic. Their quantity reached 300. It is not a chance that zonal stratigraphy is considered to be one of the most significant achievement of the modern geology.

There are different interpretations of essence and goals of zonal stratigraphy, techniques of separation of zones, and evaluation of zones as stratigraphic units. Particularly it is reflected in International Stratigraphic Guide (Murphy, Salvador, 1999), Russian Stratigraphic Code (Zhamoida, 2006), and a number of stratigraphic reports of the last years. It concerns different approaches to:

- (a) establishment of different types of zones (biostratigraphic zones and chronozones, oppel-zones and biohorizons, etc.);
- (b) assessment of spatial distribution of zones (global or provincial) and a role of sedimentological factor;
- (c) definition of zones as stratigraphic units (relationships with geostatigraphic units of the standard and regional scales).

The latest publications show that because of the different interpretations of zones, authors should explain usage of certain type of zone (for example, when they use the terms “interval-zone” or “assemblage-zone”, what limitations stem from application of datum-levels, and others). It is common opinion, that biostratigraphic zones used widely by paleontologists and stratigraphers cannot be a final goal of stratigraphy although they provide a base for solution of many important problems (definition of certain stratigraphic levels, correlation of different biofacies, and others). At the same time, the most important stratigraphic units are chronozones, which correspond to stages or phases of geological evolution of basins and are marked by distinct fossil assemblages and other properties (magnetic and other characteristics) in the type sections. Therefore, in Russian Stratigraphic Code biostratigraphic zones are regarded as special units and chronozones as general units of integrated substantiation. Now it becomes clear that unlike chronozones, biostratigraphic zones often have diachronous boundaries and provincial but not global distribution. This is not frequently taken into account at practical correlations. A special attention should be paid to a scale of these occurrences when refining stratigraphic scales.

It should not be forgotten that magneto-, litho-, and cyclostratigraphic markers should be used to assess isochronism of zonal boundaries. Many zonal reconstructions do not look faultless without such a control.

If we consider zonal stratigraphy not only in applied aspect but in a wide scientific one, it fits in with the geohistorical concept of stratigraphy, which is now reflected in “dynamic”, or “ecosystem”, or biosphere stratigraphy (Gladenkov, 2004). Establishment of stages of geological development of the Earth and its separate parts, reconstructions of changes in the organic world at the biogeocoenotic and biospheric levels, complex study of paleobiotic assemblages are thought to be one of principal lines of stratigraphic investigations.

At present discussions are being organized and experience of zonal stratigraphy is being summarized in Russia. In particular, a large book titled “Biozonal stratigraphy of the Phanerozoic in Russia” and devoted to this problem has been published recently (Koren, 2006).

References

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