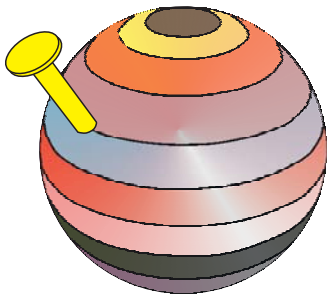

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Abstracts

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Integrated ammonite-belemnite infrazonal scales as instrument for detailed stratigraphy (an example from the Lower Callovian of Russian platform)

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The concept of infrazonal stratigraphy, elaborated mostly by John Callomon in the last quarter of the XX century, is the most popular approach among Jurassic ammonite stratigraphers. The application of this concept to the lower Callovian of Eastern European platform resulted in elaboration of very detailed schemes, comprising up to 26 biohorizons. General principles and methods of describing biohorizons, used by different authors, are quite diverse and not unified. However, the highest degree of resolution was achieved by describing successive biohorizons on the base of chronospecies and chronosubspecies of certain ammonite lineages (*Paracadoceras→Cadochamoussetia→Chamoussetia* lineage for the lower part of Lower Callovian; *Kepplerites* (*Gowericeras*)→*Sigaloceras→ Catasigaloceras→Kosmoceras* lineage for the upper part of lower Callovian to upper Callovian). The resulting infrazonal ammonite scheme contains not only "index lineage", but several parallel phyletic successions of biohorizons, drawing the evolutionary history of the group on the studied time interval. Additionally, short episodes of immigration of alien species can be used for justification of "immigrational" biohorizons. Principally, the approach described above for ammonites, is applicable to other fossil groups, for example, belemnites, which are not widely used for stratigraphy and characterized by relatively similar mode of life (nektonic and necto-benthic).

In 2012-2014 the authors have performed the study of all most important sections of the Lower Callovian at Russian platform, counting over 25 localities and sampled over 1500 belemnite rostra, collected level-by-level together with ammonites. As a result, the lower Callovian was subdivided by belemnites into 4 parallel series of successive phylogenetic biohorizons, based on 4 different phyletic lines inside the boreal family Cylindroteuthidae (*Pachyteuthis* s. str.; *Cylindroteuthis* s. str., "*Cylindroteuthis*" *kowalevi*; *Communicobelus → Lagonibelus* (*Holcobeloides*)). Each succession covers certain interval within lower Callovian and partly overlaps with other successions. The total number of successive units for the whole lower Callovian is up to 14 biohorizons, which can be grouped into 4 larger units (=zones), characterized by well-recognizable assemblages on generic level. It is also possible to select biohorizons based on immigration events of belemnites from Tethys. Resulting scheme in belemnites provides a new biostratigraphic chronometer, independent to ammonite succession and comparable with ammonites in biostratigraphic resolution. The following observations can be made:

1. in non-condensed sections, well-characterized by both groups, the positions of boundaries between belemnite biohorizons never match with those of ammonite sequence, thus allowing further detalization of ammonite subdivision by belemnites.
2. in cases, when boundary between two successive belemnite biohorizons was traced in several section, its position inside certain ammonite horizon is always the same. This means that "presumably isochronous" boundaries of ammonite biohorizons are really more or less isochronous.
3. large changes in belemnite biota, reflected in zonal boundaries, are not connected with zonal boundaries in ammonites, thus indicating relatively independent evolution and radiation within both groups.
4. Belemnite immigration events from Tethys always tied up with similar events in ammonites, however, ammonite events are more numerous in total.
5. lower boundaries of conventional belemnite units (zones), characterized by certain appearance of belemnite complex (different genera), are often immigrational and are evidently diachronous in very distant sections; while certain phylogenetic biohorizons, based on index species, often can be traced over the whole studied territory and thus have higher potential for precise correlation.

To conclude, integration of parallel ammonite and belemnite infrazonal scales provides outstandingly precise correlations even for distantly spaced sections. The investigation was supported by RFBR grants No. 15-05-03149 and 15-05-06183.