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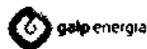
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Lower and Middle Jurassic Stratigraphic Scheme of the Western Caucasus: Problems of Correlation and Division

V. Ja. Vuks

Abstract The western part of the official regional stratigraphic schemes of the Lower and Middle Jurassic of the Caucasus is considered in this paper. The completion of this work allows an assessment to be made of the degree of validity of the various stratigraphic units according to the requirements of the Stratigraphic Code of Russia and of their association in groups. In the published descriptions of some formations, there is an insufficient amount of information to establish new local stratigraphic units according to the requirements of the Stratigraphic Code of Russia. Therefore, there is no particular justification for the legitimacy of these stratigraphic units. This review of the stratigraphic division of the Lower and Middle Jurassic of some zones of the Western Caucasus and the validity of the establishment of formations and groups illuminates the different degree of development of the stratigraphic schemes for all zones of the region considered. New groups are presented herein and the stratigraphic intervals of several known groups are changed. Some proposals for improving the stratigraphic scheme for the Caucasus are presented and discussed in the paper.

Keywords Jurassic • Stratigraphic scheme • Western Caucasus

Introduction

In Russia, work is currently underway on the creation of a new generation of maps at scales of 1:200,000 and 1:1,000,000. This project makes it necessary to improve the official regional stratigraphic schemes. Therefore, the work has led a new analysis of the western part of the official regional stratigraphic schemes of the

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Caucasus (Rostovtsev and Krymholtz 1984) and of the more modern schemes proposed in the fundamental paper "Jurassic of Caucasus" (Rostovtsev 1992), and also of some other publications on this theme (Rostovtsev 1964; Prutskii and Panov 1981; Panov and Prutskii 1983; Panov 2006; Panov and Lomize 2007).

The work on this project of constructing a new generation of geological maps allows an assessment to be made the degree of validity of the studied stratigraphic units according to the requirements of the Stratigraphic Code of Russia (Zhamoida 2012) and the opportunity of associating them in groups. For geological mapping at a scale of 1:1,000,000, it would be better to organize the stratigraphic units more generally than by formation, for example, by the combination of formations into groups. In this paper, the international term "formation" instead of the Russian term "suite" is used, and although these terms are not completely similar, the convergence tendency in stratigraphic terminology is observed (Zhamoida 2012).

Results

An illustration of the problem concerns the Psebai Formation proposed for Pliensbachian-Aalenian deposits in the western part of the Laba-Malka zone and in the Pshekish-Tyrnyauz and Arkhyz-Guzeripl zones (Beznosov et al. 1973). In this case, three formations (the Chuba, Bagovskaya, and Tuba Formations) were established for the same stratigraphic interval in the aforementioned area in the official regional stratigraphic schemes of the Caucasus (Rostovtsev and Krymholtz 1984) (Fig. 1). Thus, the "Psebai Formation" consists of three parts and each part corresponds closely to this formation in age and lithological composition. Thus, it is possible to combine these three formations into a new group, namely, the Psebai Group. The Psebai Group rests unconformably on the Bugunzha Formation, but the lithological compositions of these deposits are very similar and the breaks in sedimentation very small. Consequently, the stratigraphic interval of the Psebai Group can be increased. Therefore, the Lower Jurassic and Aalenian deposits could be united into one group (the Psebai Group) for the aforementioned area. The most complete section of the Psebai Group is found in the western part of the Laba-Malka zone.

In the 1980s, the Pseashkha zone was separated from the Arkhyz-Guzeripl zone and four new formations (the Pslukh, Chugush, Pravopseashkha, and Laura formations) were proposed for the new zone (Prutskii and Panov 1981) (Fig. 1). These new formations are typical for the Pseashkha zone only. The three oldest formations in this zone cannot be well defined in age, because there is no fauna. In the published descriptions of some formations, there is insufficient information for the establishment of new local stratigraphic units according to the requirements of the Stratigraphic Code of Russia. Therefore, there is not complete confidence in the validity of these stratigraphic units.

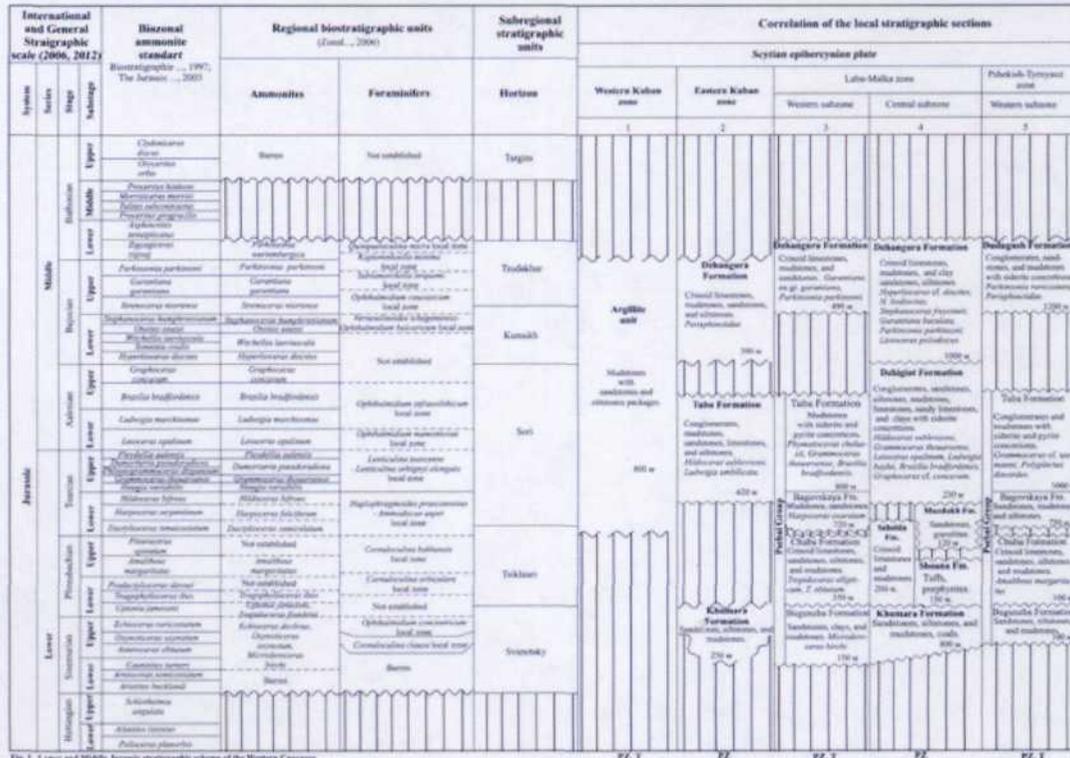


Fig. 1. Lower and Middle Jurassic stratigraphic scheme of the Western Caucasus.

Fig. 1 Lower and Middle Jurassic stratigraphic scheme of the Western Caucasus

The Psekhako-Berezovskaya and Goitkh groups were proposed for the Goitkh-Achishkho zone by Panov and Prutskii (1983) (Fig. 1). The Psekhako-Berezovskaya Group corresponds to a Sinemurian-Toarcian age (Panov and Prutskii 1983). In the published descriptions of some formations, there is insufficient information for the establishment of new local stratigraphic units according to the requirements of the Stratigraphic Code of Russia. The Goitkh Group was established in the 1960s and was assigned to the Aalenian. It consists of three formations, which contain layers with volcanic rocks. Above the strata of the Goitkh Group there are two formations (the Sosnovskaya and Kochkanovskaya formations), which can be combined into another group, because these deposits have no volcanic rocks and there are conglomerates at the base of the lower formation (the Sosnovskaya Formation).

The Lower and Middle Jurassic sequences of the Caucasus are represented by the Krasnopolyana Group (Panov and Prutskii 1983) in the Chkhaltinsko-Lailinskaya zone. In the descriptions of some formations, there is insufficient information for the establishment of new local stratigraphic units according to the requirements of the Stratigraphic Code of Russia. Furthermore, it should be noted that the aforementioned group, which covers the Lower and Middle Jurassic, is hardly convenient for conducting geological mapping and for proposing a subdivision of strata. The lithological composition of the upper part of the Krasnopolyana Group (the Achishkho and Betag formations) is very similar to the coeval deposits (Porphyrite Group) of the neighbouring Gagra-Dzhava zone.

Thus, it is proposed to reduce the Krasnopolyana Group by removing from it the two formations (Achishkho and Betag Formations) at the top of this sequence. It is proposed to assign the Achishkho and Betag Formations to the Porphyrite Group (Fig. 1).

The Lower and Middle Jurassic sequences of the Gagra-Dzhava zone are represented by the Porphyrite Group with the Anchkhoi and Betag formations (Fig. 1). It is proposed to expand the Porphyrite Group by including the Betag Formation, which caps a section of deposits and which marks the completion of volcanic activity and the appearance of terrigenous deposits in this territory in the Middle Jurassic. The name of the Porphyrite Group does not conform to the requirements of the Stratigraphic Code of Russia and therefore it would be better to change this name. The decision to use the name "Anchkhoi Formation" for deposits that lie below the Porphyrite Group is debatable and is not defined (Panov and Prutskii 1983; Rostovtsev 1992; Panov and Lomize 2007).

This short review of the stratigraphic division of the Lower and Middle Jurassic of some zones of the Western Caucasus and the validity of the allocation of formations and groups illustrates the different degree of development of the stratigraphic schemes for the entire region under consideration. It should be noted that the problem of the association of formations and other units into larger divisions was considered in detail by Rostovtsev (1964), who combined the Lower and Middle Jurassic of the Krasnodar Territory (Western Caucasus) into several complexes. That author divided the considered territory into three parts and offered a typical set of complexes for each of them. In the most northern part of the region (the Eisk zone) at the base of the Lower Jurassic (Sinemurian to lower part of the Pliensbachian), the Humara Complex was proposed. It corresponds to and includes in some places only the Bugunzha Formation with a thickness of no more than 200 m. However, a group cannot consist of only a single formation, according to the Stratigraphic Code of Russia. Thus, for the Western Caucasus, it is hardly possible to transfer these complexes to a group rank as many of the complex names are used for the formation names and therefore cannot be used for groups.

Conclusions

One of the main problems for defining some formations is the lack of completeness of their descriptions, which does not conform to the requirements of the Stratigraphic Code of Russia. Therefore, the legitimacy of the use of such formations for state geological mapping is a difficult problem. The establishment of groups must conform to the requirements of the SCR. It is desirable to limit their stratigraphic intervals in certain cases by coordinating this with the problem of the division of deposits for geological mapping, so that increasing the size of the divisions indefinitely does not occur.

The work presented here has analysed the validity of the establishment of certain Jurassic formations and groups. New groups have been presented and the

stratigraphic intervals of several known groups have been changed. The paper has also offered proposals for improving the official regional stratigraphic scheme of the Lower and Middle Jurassic of the Caucasus.

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