

NEW PROPOSALS FOR THE RUSSIAN GENERAL STRATIGRAPHIC SCALE OF THE QUATERNARY

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Recent changes of the International Chronostratigraphic Chart (ICC) of the Neogene and Quaternary in 2009 [Finney, 2010] required a coordinated modification in the upper part of the General Stratigraphic Scale of Russia (GSS). Although there were variety of opinions on the lowering of the base of Quaternary [Gladenkov, 2010; Tesakov, 2007, 2013], the decision was ultimately approved by Interdepartmental Stratigraphic Committee (ISC) of Russia [Zhamoida, Leontieva, 2012]. The changes in the internal structure of the Russian domestic scale of the Quaternary have, however, caused a debate. The structure of the Quaternary in the GSS of Russia traditionally differs from that of the International stratigraphic scale. As compared to the tripartite division of Pleistocene in the ICC, i.e. into lower, middle and upper subseries (fig. 1a), in the GSS of Russia the Pleistocene is divided into two parts (divisions), Eopleistocene and Neopleistocene (fig. 1b).

The domestic discussion is focused on the division of the Lower Quaternary. Since the lowering of the Quaternary lower boundary down to 2.58 million years has led to the inclusion of the former upper Neogene Gelasian stage (about 0.8 Ma in duration) into Quaternary, its place in GSS hierarchy is under discussion. Two main points of view have been formulated. The first one considers the inclusion of the Gelasian into Eopleistocene [Borisov, 2010; Shkatova, 2012]. The second option is the allocation of the Gelasian to the newly defined basal division of the Quaternary, Paleopleistocene [Shick, 2011, 2013]. The first option brings a seeming simplification of the Quaternary in the GSS, and equals the scope of domestic Eopleistocene and international Lower Pleistocene. According

to the second point of view, the inclusion of Gelasian into Eopleistocene violates the Stratigraphic Code of Russia. The scope of Eopleistocene in this case is doubled and a new straton under the old name will make a considerable confusion in the scientific literature and geological mapping practice.

After series of detailed discussions in 2013, the authors put forward for the consideration of ISC the following structure of the Quaternary for the Russian GSS (fig. 1c). This scheme, along with the updated structure of traditional domestic units, also contains stages of the ICC. Pleistocene is divided into three divisions: Paleopleistocene (equaling the scope of Gelasian), Eopleistocene (Calabrian), and Neopleistocene (combining scopes of provisional "Ionian" and "Tarantian" stages).

As a possible update of the upper part of the Quaternary in the International Chronostratigraphic Chart, we propose to consider the Middle and Late Pleistocene of the current ICC in the frame of a single "Italian" stage as an alternative to the two stages of the current chart. In this case, this stage will comprise sediments of natural phase of the Earth climatic evolution. Furthermore, the Quaternary including three stages, comparable in duration, will get closer to other systems of the Cenozoic. The Upper Pleistocene of the current version of ICC neither in duration nor in the character of the biota cannot be regarded as independent stage.

References

Borisov B.A. On changing the lower boundary of the Quaternary and refining age of its main subdivisions [Ob

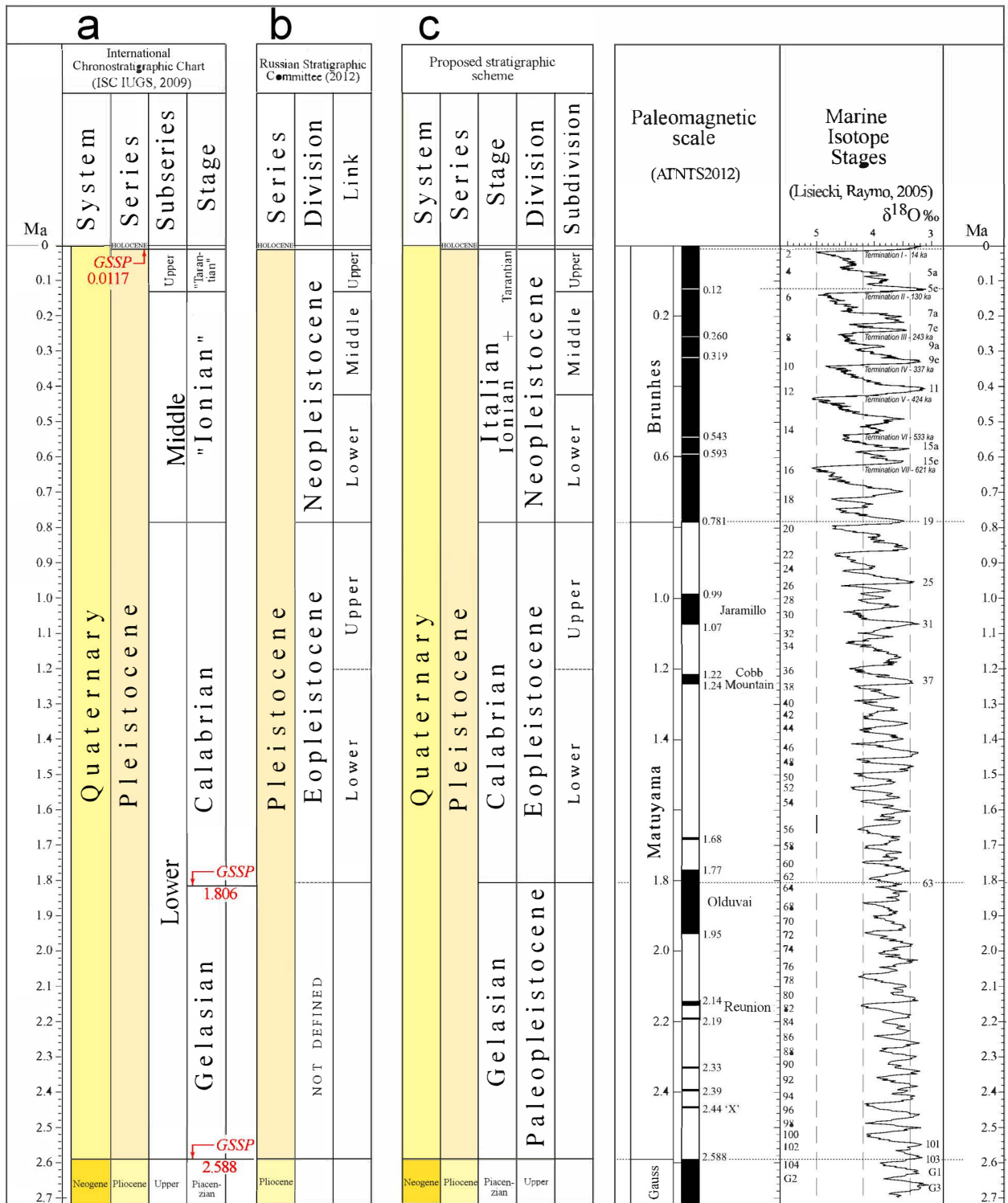


Figure 1. Subdivisions of the Quaternary System as shown in the International Chronostratigraphic Chart, IC IUGS (modified after Cohen, Gibbard, 2011) (a), General Stratigraphic Scale of Russia (b), proposed scheme (c).

- izmenenii urovnia nizhnei granitsy chetvertichnoi sistemy i utocnenii vozrasta granits ee osnovnykh podrazdelenii] // *Regionalnaya Geologiya i metallogeniya*, 2010. No. 41. P. 26-28. [in Russian]
- Cohen K.M., Gibbard, P.* Global chronostratigraphical correlation table for the last 2.7 million years. Subcommittee on Quaternary Stratigraphy (International Commission on Stratigraphy), Cambridge, England. 2011.
- Gladenkov Yu.B.* A topical stratigraphic discussion in the early 21st century (the status and lower boundary of the Quaternary) // *Stratigraphy and Geological Correlation*, 2010. Vol. 18, No. 2, P. 225–228.
- Finney S.C.* Formal definition of the Quaternary System/Period and redefinition of the Pleistocene Series/Epoch // *Episodes*. 2010. Vol. 33. № 3. P. 159–163.
- Tesakov A.S.* Modern debate on the status of the Neogene-Quaternary boundary [Sovremennaya diskussiya o polozenii neogen-chetvertichnoi granitsy] // *Gladenkov Yu.B. (ed.) Geological events of Neogene and Quaternary in Russia: modern status of stratigraphic schemes and paleogeographic reconstructions*. Moscow: GEOS, 2007. P. 90–95. [in Russian]
- Tesakov A.S.* The Quaternary System: the issue of the lower boundary and definition of stages [Chetvertichnaya sistema – problema nizhnei granitsy i vydeleniya yarusnykh podrazdelenii] // *Gladenkov Yu.B. (ed.) Stratigraphy at the beginning of XXI century – trends and new ideas*. Moscow: Geokart-GEOS. 2013. P. 21–25. [in Russian]
- Shkatova V.K.* Proposals on the structure of the Quaternary in the General stratigraphic scale // *Regionalnaya Geologiya i metallogeniya*. 2012. No 49. C. 23–25. [in Russian]
- Shik S.M.* Proposals on the nomenclature of the Quaternary in the General Stratigraphic Scale [Predlozheniia po nomenclature obshchei stratigraficheskoi shkaly kvartera] // *Fundamental problems, scientific results, and main perspectives of future studies: Materials of the VIIth All-Russia Congress on the study of the Quaternary (Apatity, September 12-17, 2011)*. Geological Institute of the Komi Scientific Centre of RAS: Apatity, Saint-Petersburg, 2011. Vol. 2. P. 316-317. [in Russian]
- Shik S.M.* Suggestions on the general stratigraphic scale of the Quaternary [Predlozheniya po obshchei stratigraficheskoi shkale kvartera] // *General stratigraphic scale of Russia: the current status and perspectives of refining*. All-Russia Conference. Moscow, May 23–25, 2013. Moscow: Geological Institute RAS, 2013. P. 392–393. [in Russian]
- Zhamoïda A.I., Leontieva E.N.* Postanovlenie o ponizhenii urovnia granitsy neogenovoi i chetvertichnoi sistem // *Resolutions of the Interdepartmental Stratigraphic Committee and its permanent commissions*. No. 41. Saint-Petersburg: VSEGEI, 2012. P. 9–11. [in Russian]