

New data on OSL dating of Early Khalynian deposits of Northern Caspian

Nikita Sychev (1), Tamara Yanina (2), Alexander Svitoch (2), Redzhep Kurbanov (1), and Ekaterina Badyukova (2)

(1) Institute of Geography RAS, Moscow, Russian Federation (nikita.sychev@gmail.com), (2) Faculty of Geography, MSU, Russian Federation

Ponto-Caspian region is the key region the study of which can provide information about the paleogeographic history of the central Eurasia, particularly revealing the history of the East European Plain, the Caucasus and Central Asia. However, despite the long history of the study, today there is no accepted general stratigraphic scheme of the Caspian Sea. One of the most interesting and important stages of Late Pleistocene history of Caspian is Khalynian transgression which is divided into two major phases: early and late. In the Caspian lowland Lower Khalynian stage are represented by a unique type of deposit – “chocolate clays”. A distinctive feature of these sediments is widely distributed among Lower Khalynian deposits of Northern Caspian and the Volga region. All clay deposits are confined to the diverse origins of depression before-Khalynian relief. Chocolate clays formation consists of facies: mono-clay (typological), layered, sand- and silty-clay (Svitoch, Yanina, 1997).

Determining the age of chocolate clays by optically stimulated luminescence (OSL) in our view will allow better understanding of their genesis. Age of chocolate clays of Lower Volga was widely dated using the radiocarbon. However, the existing chronology is controversial, raises a number of issues, primarily due to the material of which are used for dating – thin shells of Caspian mollusks of the *Didacna Eichw.* genus, which are characterized by a significant isotopic exchange with the enclosing sediments (Arslanov, 2015).

Lower Volga region is characterized by very complex geological structure of the Late Pleistocene deposits (alternating continental aeolian, alluvial and slope sediments with marine Caspian deposits of different age). There are many conflicting opinions, not only with respect to paleogeographic features of the area, but also to its precise chronology. The differences in opinion over the age of the individual stages of development of the Caspian Sea (transgressions and regressions) reaches high values (Arslanov, 2015). Therefore in this paper we describe the new OSL-dating results of Khalynian transgression sediments.

Two key sections were selected for study: Srednaya Akhtuba and Nizhneye Zaymische. The first section - Srednaya Akhtuba is located in the slope of the ravine, cutting through the marine plain, 1 km above the bridge across the Akhtuba river. Nizhneye Zaymische located in the slope of Volga-Akhtuba valley, cutting through the marine Khalynian plain.

For the dating of these deposits we used Risø OSL-reader (provided by Nordic luminescence Lab and DTU), and standard SAR protocol (Murray, 2004).

The obtained results characterize 5 equivalent doses of chocolate clays samples. The first date was obtained for the top of the chocolate clay, one for the bottom. Accordingly, two calculated OSL-dates indicate the age of these deposits corresponding to initial stage of the first marine isotope stage (MIS-1). These dates are well correlated with the characteristics of age, obtained by radiocarbon and U-Th methods that show their high reliability. The equivalent dose obtained for chocolate clays of Nizhneye Zaimishce is 43 Gy, radiation dose in Akhtuba sediments was about 3.1 Gy per thousand years.

This research was supported by the Russian Science Foundation Project 14-17-00705.