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Conference on Quaternary Sciences**

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Resources**

**Latifi S.**

Application of landform planation index (LPI) in identifying planation surfaces and paleotopography of Gorgan loess plateau (northeast of Iran).....

***Session 5: Soil formation on Quaternary Landforms***

**Rafieisarbijan H.R., Jafari A., Heidari A., Abbasnejad A.**

Mineralogical and geochemical characteristics of vesicular horizons of desert soils in the Rayen region-Kerman.....

***Session 6: Quaternary Evolution of the Caspian Sea and its Basin***

**Badyukova Ye.**

Southeast Caspian coast evolution during Holocene.....

**Semikolennykh D., Kurbanov R., Murray A., Yanina T.**

Age of the Khvalynian Strait in the Late Pleistocene History of the Manych Depression.....

**Kurbanov R., Murray A., Yanina T., Butuzova Ye.**

Luminescence chronology of the great Khvalynian transgression from the Kosika section (Lower Volga).....

***Session 7: Natural hazards (earthquakes, landslides, sinkholes, ect...)***

**Kariminejad N.**

The spatial and possess analyses of piping and gully head erosions using unmanned aerial vehicles (UAV) images.....

**Kornejady A., Golijirandeh A., Alizadeh H., Samadi M., Karimi M., Alizadeh A., Haghanishirazi M., Abolhasani H., Hosseinalizadeh M.**

An overview of the Applications of Advanced Tools in Natural Hazard Studies in Iran.....

## **Luminescence chronology of the great Khvalynian transgression from the Kosika section (Lower Volga)**

**Kurbanov R., Murray A., Yanina T., Butuzova Ye.**

<sup>1</sup>Institute of Geography, Russian Academy of Sciences, Moscow, Russia,  
kurbanov@igras.ru,

<sup>2</sup>Nordic Laboratory for Luminescence Dating, Department of Geoscience, Aarhus University, DTU Risø Campus, DK-4000, Roskilde, Denmark anmu@dtu.dk

<sup>3</sup>Faculty of Geography, Lomonosov Moscow State University, Moscow, Russia  
didacna@mail.ru

At the present time the stages of the Caspian sea-level evolution during the largest Late Quaternary Khvalynian transgression remains open. There have been attempts to establish an absolute chronology based almost entirely on radiocarbon dating, often of individual shells. This approach is of course limited to <50 ka but in any case has given very conflicting results; as a result, no consensus view of the transgression/regression history has evolved. In an attempt to resolve these problems, a major project (IGCP-481) was established to re-date the more recent transgressions using radiocarbon. Unfortunately, most ages were again unexpectedly young and stratigraphically inconsistent (Yanina, 2014). Existing radiocarbon chronology does not allow resolving two transgressions (Early and Late Khvalynian). Based on clear palaeontological and geomorphological evidence, these must be very different in age, but shells associated with both transgressions gave very scattered ages of between 8 and 50 ka (Arslanov et al, 2015). It is presumed that these difficulties arose because of reservoir effects and the very thin shell developed by many fauna during cold periods. Another controversial issue is the stage between Early and Late Khvalynian – Enotaevka regression. Firstly identification at the Enotaevka section of Lower Volga was made in the middle of XX century and based on the description of thin subaerial strata between two marine horizons containing Khvalynian marine fauna. Unfortunately later the particular described section was lost during Volga erosion and construction on the coasts. Thus for the long time this important event describing deep regression phase of the Caspian sea had no

available section with During 2014-2018 fieldworks we made an effort to find the section with clear continental sedimentation profile within two Khvalynian transgressive series. And such deposits were identified at Kosika location, on the right valley side of the Volga River, 4 km to the North of the Kosika village. The total thickness of the outcrop is 10 m. The outcrop is confined to the western base of the Baery knoll. The part of the outcrop with the clearest position of the Enotaevka regression deposits is confined to the northern limit of the Baery knoll. Top of the section is represented by the upper Baery knoll strata (deflated sands), that passes through clear erosional boundary to horizon of loess (~95 cm) with clear evidence of soil-formation. Within these subaerial sediments a clear differentiation is observed in the grain-size: the upper layer (0-65 cm) is loamy (dusty medium loam), below - sandy (a silty light loam), alternating to the base of the separated stratum with a silty sandy loam. Within the subaerial part of the section, the profile of the paleosol is identified. The profile of the paleosol represented by a series of genetic horizons and reveals clear evidence of erosion. Apparently, the original profile was abraded during the Later Khvalynian transgression resulting in preserved illuvial horizon. This strata passes into the marine clays with poor collection of shells (mostly *Dreissena* Sp). The applied luminescence dating allowed us to reconstruct the timing of the main stages of the environmental evolution during the second half of Khvalynian transgression. 15 OSL-dates describes main stages: re-worked Upper Khvalynian sands of the upper Baery knoll strata is dated  $8,3 \pm 0,5$  ka; paleosol formed in the Enotaevka regressive horizon dated 12 - 13 ka; Lower Khvalynian sediments is characterized with three dates 19-22 ka; the basis of the section (Hyrceanian horizon) is dated 113-133 ka. This research for the first time reveals the structure of Enotaevka regressive series of the Lower Volga and describes the numerical age of the main stages of the Late Quaternary environmental evolution of the region. Research was supported by the Russian Science Foundation, project 19-77-10077.

**Key words:** Late Quaternary, OSL dating, Late Khvalynian transgression, Holocene, Caspian Sea.

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