reveals regular alternation of glacial and interglacial communities differing essentially in their species composition and energetic structure. In contrast, the Early Pleistocene record (including continuous sequences covering terminal cycles of that stage in high resolution - Stránská skála, Koněprusy C718 and JK) shows greatly diversified but structurally homogeneous communities responding to glacial oscillations with minute changes only. The transition between the two ways of community dynamics is documented in details at sedimentary complex Chlum 4 where three glacial cycles appear in direct superposition. The upper two cycles at section Chlum 4 demonstrate by a reliable vertebrate and mollusc record this biostratigraphic boundary as a sharp switch associated with LAD *Mimomys savini* and *Lagurus pannonicus,* FAD *Arvicola* and FAD of the glacial type community (with *Dicrostonyx simplicior* and *Microtus gregalis*) at the glacial stage between the two cycles.

Biostratigraphic correlation operating with faunal records from continuous loess series in Červený kopec (Red hill) in Brno dates that transition to MIS 16. The transition was accompanied by rearrangement of phylogenetic morphoclines in more clades and appearance of exotic taxa specific for the transitional period during the cycles preceding to the respective biostratigraphic boundary (Q2/Q3): *Macroneomys, Petauria, Ursus thibetanus, Campylaea capeki* etc.

The sedimentary complex in Chlum 4 with a series of cave deposits (covering a period from MIS 20 to MIS 15) overlays the gravels of 80 m high terrace of Berounka river, the uppermost terrace prior to stage of intensive deep river erosion, what dates it to the cycle MIS 22-21. The structure of the complex suggests that the underground cavities were opened for subsequent sedimentary capture by removing their former infill by river activity. Synchronously, a similar situation preformed also the conditions for sedimentation of Stránská skála talus deposit. Also the evacuation of vertical communications of Koněpruské caves prerequisite for sedimentation of sequences in the sites C718 and JK appeared probably due to local tectonic instability activated by rapid uplift of Bohemian Massif starting at that time.

The increased intensity of alpine tectonic, globally patterning the EMPT period, driving the continuous Middle Pleistocene uplift of Bohemian Massif and neighboring regions, resulted in increased declivity and increased deep erosion. In karst regions it reduced a probability of preservation of deposits of that age what explains a curious anomaly in fossil record of this region: almost complete absence of the Middle Pleistocene deposits contrasting to a high number of the earlier records.

In these regards, the case of the EMPT reminds us that a detailed study of faunal records from cave deposits can not only provide important biostratigraphic and paleoecologic issues but also relevant information on local karst history and regional tectonic development (and vice versa!).

Stratigraphical and paleotheriological description of Holocene sediments from Nizhneirginsky grotto (middle Urals)

Izvarin E. P & Ulitko A.I.

Institute of Plant and Animal Ecology, Ural branch of the RAS, Russian Federation, Yekaterinburg, 8 Marta str., 202; izvarin_ep@ipae.uran.ru, ulitko@ipae.uran.ru

Session 1: Poster

Results of stratigraphical and paleotheriological study of Nizhneirginsky grotto Holocene sediments are presented. The grotto was detected and described by authors in 2009 year. It is

located on the left bank of the Irgina river (left tributary of the Sylva river, Kama river basin), on the outskirts of the village Nizhneirginskoe, Sverdlovsk region. The river valley lies in the southwest of Middle Urals, on a border between Krasnoufimsky insular forest-steppe and mixed coniferous-broad-leaved forest. The grotto is located in a limestone rock 70 m above the river. The site has southeast exposition. Entrance is 3.2 m in width and 3-3.5 m in height. The length of the grotto is 4 m. The total area of the excavation square is 1.75 m2 and the depth of the pit to rock bottom is about 0.47 m. Sedimentary sequence contains 3 layers (Ulitko 2014).

Layer 1 is humus sandy loam with inclusion of numerous small and middle-sized rubbles. Thickness is 0.05-0.07 m. The layer contains not numerous remains of birds and mammals and recent anthropogenic trash. Discovered mammal fauna of the layer included fossils of: European mole *Talpa europaea*, bats Chiroptera indet., mountain hare *Lepus timidus*, Siberian flying squirrel *Pteromys volans*, northern birch mouse *Sicista betulina*, common hamster *Cricetus cricetus*, grey red-backed vole *Myodes rufocanus*, bank vole *M. glareolus*, northern red-backed vole *M. rutilus*, water vole *Arvicola amphibius*, common vole *Microtus arvalis*.

Layer 2 is brown sandy loam containing small- and middle-sized rubbles. Thickness is 0.12-0.15 m. The layer contains the largest number of vertebrate remains especially rodent bones and teeth. Among mammals, there were found: European mole *Talpa europaea*, Eurasian water shrew *Neomys fodiens*, common shrew *Sorex araneus*, Laxmann's shrew *S. caecutiens*, even-toothed shrew *S. isodon*, Eurasian pygmy shrew *S. minutus*, bats, mountain hare *Lepus timidus*, steppe pika *Ochotona pusilla*, Siberian flying squirrel *Pteromys volans*, Eurasian red squirrel *Sciurus vulgaris*, northern birch mouse *Sicista betulina*, striped field mouse *Apodemus agrarius*, herb field mouse *A. uralensis*, common hamster *Cricetus cricetus*, grey red-backed vole *Myodes rufocanus*, bank vole *M. glareolus*, northern red-backed vole *M. rutilus*, water vole *Arvicola amphibius*, tundra vole *Microtus oeconomus*, field vole *M. agrestis*, common vole *M. arvalis*, red fox *Vulpes vulpes*, brown bear *Ursus arctos*, least weasel *Mustela nivalis*, stoat *M. erminea*. Radiocarbon dates obtained from small mammal bones from the layer corresponded to Subatlantic: 795±30 yrs B.P. (SPb-971) in upper part and 2579±70 yrs B.P. (SPb-913) and 2650±70 yrs B.P. (SPb-915) in down part.

Layer 3 is light gray with a brownish tinge sandy loam with inclusion of small- and middle-sized rubbles and large lumps. It contains a large amount of vertebrate remains. Total thickness is up to 0.25 m. The layer becomes light brown in the western part of the pit (sublayer 3a). European mole *Talpa europaea*, common shrew *Sorex araneus*, Eurasian pygmy shrew *S. minutus*, bats, mountain hare *Lepus timidus*, steppe pika *Ochotona pusilla*, Siberian flying squirrel *Pteromys volans*, Eurasian red squirrel *Sciurus vulgaris*, Eurasian beaver *Castor fiber*, northern birch mouse *Sicista betulina*, striped field mouse *Apodemus agrarius*, yellow-necked mouse *A. flavicollis*, herb field mouse *A. uralensis*, Eurasian harvest mouse *Micromys minutus*, common hamster *Cricetus cricetus*, grey red-backed vole *Myodes rufocanus*, bank vole *M. glareolus*, northern red-backed vole *M. rutilus*, water vole *Arvicola amphibius*, tundra vole *Microtus oeconomus*, field vole *M. agrestis*, common vole *M. arvalis*, gray wolf *Canis lupus*, red fox *Vulpes vulpes*, martens *Martes* sp.. Layer 3 gave some radiocarbon dates indicating the second half of Subboreal: 2945±80 yrs B.P. (SPb-809) in upper part of the layer, 3120±80 yrs B.P. (SPb-808) and 3350±100 yrs B.P. (SPb-806) in middle part and 3770±100 yrs B.P. (SPb-914) in bottom part.

Taphocenoses comprise mostly fossils of mammals, especially rodents. Moreover, there are some bones of fish, amphibians, reptilians and birds. Taxonomic and preservation analysis of bone material showed that the most of small mammal remains were accumulated as a result of predation activity of birds. Most of large mammal bones are highly fragmented. Perhaps sometimes the grotto was used as a den for carnivorous mammals. Finally, considering well preservation and a large amount of bat fossils probably they were accumulated as a result of

natural death of the animals. Taxonomical composition of the taphocenoses corresponds to recent fauna of the Middle Urals (Bolshakov et al. 2006) excepting steppe pika *O. pusilla*. Now the species does not inhabit the Middle Urals, but it was common in this territory in the Late Pleistocene and Early Holocene. Evidently steppe pika lived in the Middle Urals in Krasnoufimsky insular forest-steppe as relict species of late Pleistocene mammal fauna till late-Holocene time.

Acknowledgments This study was performed within the frameworks of state contract with the Institute of Plant and Animal Ecology, Ural Branch, Russian Academy of Sciences, and partly supported by the Russian Foundation for Basic Research (project no 18-34-00270 mol_a) and by the Complex Program of the Ural branch of the Russian Academy of Sciences (project no. 18-4-4-3).

Bolshakov V. N., Berdyugin K. I. & Kuznetsova I. A., 2006: Mlekopitayushchie Srednego Urala [Mammals of the Middle Urals]. Yekaterinburg, pp. 224. In Russian.

Ulitko A.I., 2014: Stratigraphy of sediments and mammals in the karst caves in the Irgina river valley (Middle Urals). In: The Quaternary of the Urals: global trends and Pan-European Quaternary records: Int. conf. INQUA-SEQS 2014, Yekaterinburg, Russia, September 10-16, 2014, 174-176.

The Art of the Hunnu Ivolginsky Settlement (Baikal Siberia)

Khenzykhenova F.[1], Kradin N.[1], Prokopets S.[2], Simukhin A.[1], Imenokhoev N.[1], Namzalova O.[1] & Namsaraeva S.[3]

[1] Institute of Mongolian, Buddhist and Tibetan Studies, Siberian Branch, Russian Academy of Sciences (RAS); 6 Sahjanovoi str., 670047 Ulan-Ude, Russia; khenzy@mail.ru; Kradin@mail.ru

[2] Institute of History, Archaeology and Ethnography of the Peoples of the Far-East, Far- Eastern Branch of the RAS, 89 Pushkina str., 690001 Vladivostok, Russia; stas842005@mail.ru

[3] Geological Institute, Siberian Branch of the RAS, 6a Sahjanovoi str., 670047 Ulan-Ude, Russia; solonganamsaraeva94@mail.ru

Session 4: Oral

Ivolginsky fortified hillfort, located in the Western Transbaikalia on the Selenga River, is a famous archaeological site of the Xiongnu Empire time (Davydova 1986; Konovalov 1976, 1999, 2008; Konovalov *et al.* 2015, 2016, 2017; Kradin, Danilov & Konovalov 2004, 2012, 2014; *etc.*). This archaeological object existed from the first century BC to the second century of our era. Various crafts were developed here: pottery, metallurgy, and various types of art objects.

New excavations of the Ivolginsky ancient settlement under the supervision of Corresponding Member of the Russian Academy of Sciences N. Kradin allowed to obtain a first materials of mollusc, fish, and small mammal fauna, and collection of art objects in connection with the use of sieves for washing loose deposits with a cell diameter of 1 mm 2017-2018.

Species composition of the fauna of molluscs, amphibians and small mammals testifies to the existence of both taiga patches and dry steppe and forest-steppe near the river or temporary pond.

Unique findings are represented by a bone needle 1-2 mm thick, a tiger head made of bone, fragments of bracelets from bone, imitations of kaori shells made of perlovitsa and bronze, numerous beads of amber, wood, various minerals, and pendants.

Acknowledgements This study was supported by the Ministry of Education and Science of the Russian Federation (Grant № 14.W03.31.0016).

INQUA Section on European Quaternary Stratigraphy

Quaternary Stratigraphy in Karst and Cave Sediments

PROGRAM & ABSTRACTS & GUIDE BOOK

Postojna
2018

Editors:
Nadja Zupan Hajna, Andrej Mihevc, Magdalena Năpăruș-Aljančič

Issued by:
Karst Research Institute, Scientific Research Centre of the Slovenian Academy of Sciences and Arts, Titov trg 2, 6230 Postojna, Slovenia

Published by:
ZRC Publishing

Represented by:
Oto Luthar

Printrun:
100

Organizing committee:
Andrej Mihevc, Markus Fiebig, Nadja Zupan Hajna, Petra Jamšek Rupnik

Supported by:
Scientific Research Centre of the Slovenian Academy of Sciences and Arts
INQUA Commission on Stratigraphy & Chronology (SACCOM)
INQUA Section on European Quaternary Stratigraphy (SEQS)
SINQUA Slovenian National INQUA Committee

Cover photo:
Sediment section in Markov spodmol (A. Mihevc)

Printed by:
Cicero Begunje, d. o. o.

First edition, first printrun.

Postojna 2018

CIP - Kataložni zapis o publikaciji
Narodna in univerzitetna knjižnica, Ljubljana

551.44(082)
551.7"628.6"(082)

Quaternary Stratigraphy and Karst and Cave Sediments: program, abstracts & guide book/ [editors Nadja Zupan Hajna, Andrej Mihevc, Magda Aljančič]. - Ljubljana: ZRC Publishing, 2018

ISBN 978-961-05-0111-4
1. Zupan Hajna, Nadja
296246272