и крайний север района отличается высокими значениями TRI, а следовательно, высоким эрозионным потенциалом.

Таким образом, данные SRTM и возможности их обработки в различных геоинформационных системах открывают огромные возможности для анализа рельефа с географических и геоэкологических позиций. Освоение и свободное владение ГИС должно быть неотъемлемым компонентом компетенций любого специалиста в области наук о Земле.

Список использованных источников

1. Хромых, В.В. Цифровые модели рельефа: учебное пособие / В.В. Хромых, О.В. Хромых. – Томск: ТМЛ-пресс, 2007. – 178 с.

2. Токарев, С.В. Картирование элементов рельефа земной поверхности с использованием индекса топографической позиции (на примере Крымского полуострова) / С.В. Токарев, К.Н. Рощина // Уч. зап. Крымского федерального ун-та им. В. И. Вернадского. География. Геология. – Том 1 (67). – № 4. – 2015. – С. 64-85.

УДК 551

PILOT CHIRONOMID STUDY IN LATE GLACIAL AND HOLOCENE LAKE SEDIMENTS OF LITHUANIA

Гастявичене Н.
Учреждение образования ,,Центр природных исследований", г. Вильнюс, Литва. gasteviciene@geo.lt
Научный руководитель – Шейрене В., д.н., старший научный соотрудник, Центр природных исследований, Вильнюс, Литва, seiriene@geo.lt

Впервые в Литве были проведены исследования хирономид в отложениях палеоозера, расположенного в северной части Литвы. Исследованный разрез включает отложения Голоцена и Позднеледникового время. Изменение состава таксонов по разрезу показали колебания температурного режима и палеогеографических условий.

The Late Glacial and Holocene period was characterized by several rapid and extreme shifts in climate across the North Atlantic region. The magnitude of these shifts has been recognized from sediment records using various proxies. For the past 20 years, subfossil chironomids have started to be used in paleolimnology.

Chironomidae is a family of two-winged flies (Insecta: Diptera), often referred to as non-biting midges. It is the most ubiquitous and usually the most abundant insect group in all types of freshwater. About 5 000 species [7] have been described world-wide, although it is estimated that up to 15 000 species may exist in total [8]. Approximately 1000 species are known from Europe [9].

Chironomidae are cosmopolitan and distributed globally, even to Antarctica, where they include the southernmost holometabolous insects. The larvae occur in a wide range of biotopes but most species are aquatic. There are a few fresh or brackish waters that do not support chironomid population.

Subfosil larval head capsules are well-preserved in lake sediments. Their short life cycles, ability to disperse rapidly over long distances and independence from pedogenic processes enable them to respond to changing climate and environment more rapidly than terrestrial vegetation [1]. Resent work on subfossil chironomids has focused on quantifying environmental change by developing inference models based on modern calibration set. This technique has been used successfully to develop quantitative models to infer temperature [12, 4], total phosphorus [6, 3], anoxia [10], chlorophyl a [2] and salinity [11] from subfossil chironomid assemblages.

In Lithuania, the first attempts on chironomid assemblage studies were carried out on core sediments, situated in a boggy meadow surrounded by open fields at the present day. This site is located in the northern part of Lithuania on the south-western edge of Šiauliai city. Sedimentation of the studied section, according to the radiocarbon dating, took place during the Late glacial period and the beginning of the Holocene.

7 cores were made for complex analysis. The analyses of LOI (loss on ignition), magnetic susceptibility, δ18O% and δ13C%, plant macro remains and pollen, radiocarbon dating (AMS), diatom and chironomids of the sediments have been carried out.

Sediment samples for subfossil chironomid analyses were prepared, applying standard methods [5]. The dry sediment was treated with warm 10% KOH and sieved through a 90-mm sieve. The treated sediment was examined under a stereomicroscope to extract the subfossil remains with fine forceps. The remains were mounted permanently in Euparal on microscope slides and identified under a light microscope. A minimum of 50 chironomid head capsules were enumerated from the surface samples and identified, based mainly on the identification guides of Brooks et al. 2007 [5], following the nomenclature used.

A rich Chironomidae fauna, more than 30 taxa were found in the studied sediments, and the taxa Corynocera ambigua (Fig.1), Microtendipes sp. (Fig.2), Glypotendipes sp. were dominant. Some changes in Chironomidae fauna composition were noticed throughout the sediment section. In the middle part of the section, Corynocera ambigua was the dominant taxon. This taxon thrives in cold, oligotrophic conditions. The same environmental conditions are proved by appearance of diatom representatives of Staurosira genus and Chara macrofossils (comments by D. Kisielienė and V. Šeirienė). Obtained data indicate the initial stages of lake development.

In the uppermost part of the section, the rise of the trophic status of the lake is indicated by the increase of the taxa Cricotopus sp., Dicrotendipes sp., Glypotendipes sp. In the top of the section, Chironomidae fauna almost disappeared, and it can be due primarily to the formation of oxygen deficiency in bottom water layers in deep-water zones of lakes accompanied by the development of eutrophication processes, which cause gradual suppression of chironomid larvae in the top layer [11].

The change in species composition indicates change of the ecological situation in the palaeolake: oligotrophic environment was replaced to eutrophic. It should be noticed that recent Chironomidae studies are not complete, and hopefully further investigations will give more detail information on environmental changes.

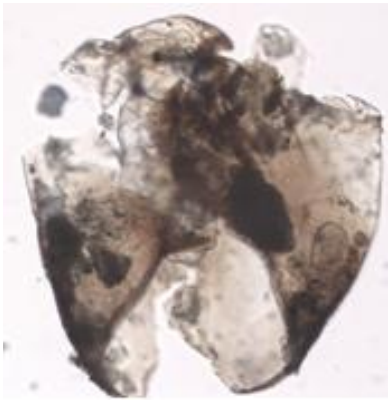

Figure 1 – *Corynocera ambigua*

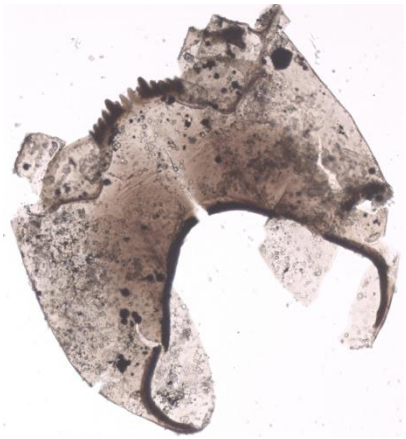

Figure 2 – *Microtendipes pedellus-type*

References

1. Birks, H.J.B., Birks, H.H. Biological responses to rapid climate change at the Younger Dryas-Holocene transition at Krakenes, western Norway // The Holocene. – Y., 2008. – Vol. 18. – pp. 19-30.

2. Brodersen, K.P., Lindergaard, C. Chironomid assemblages from Danish lakes. Classification, assessment and reconstruction of lake trophic state using a chironomid based chlorophyll a transfer function / In Brodersen, K.P. (ed) // Macroinvertebrate Communities in Danish lakes: Classification and Trophic Reconstruction. Freshwater Biol. – Y., 1999. – Vol. 42 – pp. 143-157.

3. Brooks, S.J, 2000. Late-glacial fossil midge stratigraphies (Insecta: Diptera: Chironomidae) from the Swiss Alps / In Ammann B & Oldfield F (eds) // Palaeogeography, Palaeoclimatology, Palaeoecology. – Y. 2000. – Vol. 159 – No 3-4. – pp. 261-279.

4. Brooks, S.J., Birks H.J.B. Chironomid-inferred late-glacial and early-Holocene mean July air temperatures for Krakenes lake western Norway // Journal Paleolimnology. – Y., 2000. – Vol. 23 – pp.77.

5. Brooks, S.J., Langdon, P.G., Heiri, O. The Identification and use of palaearctic Chironomidae larvae in palaeoeocology // Technical guide. Y., 2007. - No. 10.

6. Clerc, S., Hall, R., Quinlan, R., Smol, J.P. Quantitative inferences of past hypolimnetic anoxia and nutrient levels from Canadian Precambrian Shield lake //Journal Paleolimnology. – Y., 2000. – Vol. 23. – pp. 319

7. Cranston, P.S., Martin, J. Family Chironomidae /In: Evenhuis , N.L., (ed.), Catalogue of the Diptera of the Australasian and Oceanic regions // Leiden and Honolulu: E.J. Brill and Bishop Museum Press. Y., 1989. - pp. 252-274.

8. Cranston, P.S., Pinder, L.C.V. The Chironomidae / In Armitage, P.D. (eds) // The biology and ecology of non-biting midges. Chapman and Hall, London. – Y., 1995a., - pp. 365-384.

9. Lindergaard, C. Diptera Chironomidae /In Nilsson, A. (ed.) // The aquatic insects of north Europe. Apollo Books, Strenstrup. – Y., 1997. - Vol. 2., pp. 265-294.

10. Quinlan, R., Smol, J.P., Hall, R.I.,. Quantitative inferences of past hypolimnetic anoxia in south-central Ontario lakes using fossil midges (Diptera: Chironomidae) Canada // J. Fish., Aquat. Sci. – Y., 1998. – Vol. 55. – pp. 587-596.

11. Walker, I.R. Chironomids as indicators of past environmental change /In: Armitage, P., P., S. Cranston and L.C.V. Pinder (eds) // The Chironomidae: the biology and ecology of non-biting midges. Chapman and Hall, London. – Y., 1995. - pp. 405-422.

12. Walker, I.R., Levesque A.J., Cwynar L.C. Lotter, A.F. An expanded surface-water palaeotemperature inference model for use with fossil midges from eastern Canada // J. Palcolim. Y., 1997. – Vol. 18. – pp. 165-178.

УДК 631.471

ИЗУЧЕНИЕ ВЛИЯНИЯ МОРФОМЕТРИЧЕСКИХ ПОКАЗАТЕЛЕЙ НА ВЛАЖНОСТЬ ПОЧВ

Дамшевич А.Ч.
«Белорусский государственный университет», г.Минск, Республика Беларусь, aiawww@mail.ru
Научный руководитель – Клебанович Н.В., доктор с/х наук, профессор.

The article considers a possibility of using digital elevation models to calculate morphometric parameters in order to specify the data that depend on topography of soil moisture. Correlation analysis of influence of morphometric characteristics on soil moisture was carried out on the basis of GRID-models of morphometric parameters.

Целью данной работы было выявить влияние морфометрических характеристик рельефа на влажность почв. Расчет показателей проводился с использованием цифровой модели местности участка пахотных земель площадью около 24 га, расположенного около г. Минска. ЦММ была создана на основе данных тахеометрической съемки территории с пространственным разрешением 0,5 м. Разница абсолютных высот максимальной и минимальной точек данного участка составляет 22,87 м. Для исследуемого района характерны дерново-палево-подзолистые суглинистые почвы на мощных пылеватых (лессовидных) легких суглинках. В ходе исследования были рассчитаны следующие морфометрические показатели: средняя кривизна (рис. 1), крутизна склонов (рис. 2) и экспозиция склонов (рис.3).