Paleoenvironmental Reconstruction of Late Quaternary Insect Fossils, Halashazi Site, Altai Region, China.

Tianshu Zhang (1,2), Scott Elias (1), and Robert Angus (3)

(1) Geography Department, Royal Holloway University of London, United Kingdom, (2) College of Earth Environmental Science, Lanzhou University, Gansu, China, (3) School of Biological Sciences, Royal Holloway University of London, United Kingdom

The Altai region northwest China, is located in the middle of arid central Asia and is therefore sensitive to climate change. However, there is a debate on the heat-moisture pattern (warm-dry pattern or cold-dry pattern) during the early Holocene in the Altai region, and a debate on the dominant atmospheric circulation (westerlies or monsoon) control for central Asian climate changes during the Holocene, and the mechanisms that cause the arid early Holocene in central Asia. Thus, the principal aim of the project is use the MCR method to produce quantified temperature and precipitation estimates, and a high-precision palaeoclimatic record for the Altai region, based on fossil beetle assemblages, to reveal the heat-moisture pattern and its mechanisms. This project will begin to fill in the blank of Quaternary beetle research in China. Using Quaternary beetles to reconstruct palaeoenvironments is a new research method for this region, and has never before been done in China, which will provide new evidence for the palaeoenvironmental study in this area. Furthermore, this project will contribute to the beetle faunal research in Eurasia.

The sample site for this project - Halashazi Wetland (048°06'54"N, 088°21'48"E), is located at the cross-road of the Altai Mountains and the Dzungarian Basin, where two ecosystems meet. Thus the fossil beetle assemblages should show dramatic change in response to changes of climate. The sampled deposits are made up entirely of sedge peat. Two different profiles were sampled, with depths of 160 cm and 200 cm, respectively. Both profiles were sampled at 5 cm intervals, with approximately 2 kg of material in each unit. The results of the radiocarbon dating will be available in December 2016. Based on other previous studies, the bottom of the peat sediment is 11,500 cal yr BP, so project focuses on the Holocene period approximately from 10,000 cal yr BP.

More than 80 species of Coleoptera from 55 genera, 22 families have been recognised so far . At present, 22 species have been identified: 4 species of Dytiscidae, 7 species of Carabidae, 3 species of Helophoridae, 2 species of Hydrophilidae, 1 species of Silphidae, 3 species of Staphylinidae, 1 species of Coccinellidae and 1 of Chrysomelidae. Most of these species are found today in the Siberian fauna, and indicate a steppe-tundra ecosystem; only one forest species has been identified. The identification of the species will be completed in January 2017. Following this, the Holocene temperature and precipitation of the Altai region will be reconstructed by the MCR method, and more information on past plant communities will be obtained.

Reference:
Chen, F.H., Yu, Z.C., Yang, M.L., Ito, E., Wang, S.M., Madsen, D.B., Huang, X.Z., Zhao, Y., Sato, T., Birks, H.J.B., Boomer, I., Chen, J.H., An, C.B., Wunnemann, B., 2008. Holocene moisture evolution in arid central Asia and its out-of-phase rela- tionship with Asian monsoon history. Quaternary Science Reviews, 27: 351-364.
Elias, S. A., 2010. Advances in Quaternary Entomology. Amsterdam: Elsevier.