



## **Paleoenvironmental History of the Retezat Mountains (Southern Carpathians) Inferred from Geochemical Data**

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This study applied lake sediment geochemistry to reconstruct climate changes in the Southern Carpathians within the frame of PROLONG (Providing long environmental records of Late Quaternary climatic oscillations in the Retezat Mountains) project. The main aim of this project is to reconstruct the changes during the Lateglacial and the Early Holocene period in the Retezat Mountains, Southern Carpathians. After retreat of the last major glaciers numerous glacial lakes leaving behind with sediments dating back to ca. 16,000 cal. yr BP.

In 2007 and 2008 continuous undisturbed sediment cores were obtained from four glacial lakes (Brazi, Gales, Lia, Bukura) in the Retezat Mts. (Southern Carpathians, Romania) with Livingstone and modified Kullenberg corers. Two of the studied lakes are located on the southern slope (Bukura, Lia) of the mountain, while the Brazi and Gales are situated on the northern slope. After the drillings, the sediment cores were sliced into 1 cm wide subsamples. High-resolution geochemical analysis was done to study soil development and in-lake processes in response to high-frequency and high-amplitude climatic changes within the Lateglacial and Early Holocene. Loss-on-ignition was used to determine the sediment organic matter content. Total element concentrations were measured using an Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES) and Microwave Plasma Atomic Emission Spectrometer (MP-AES). Concentration of major elements by means of bulk analysis were determined and calculated in oxide forms ( $\text{Al}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{CaO}$ ,  $\text{MgO}$ ,  $\text{K}_2\text{O}$ ,  $\text{Na}_2\text{O}$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{MnO}$ ,  $\text{SO}_3$ ). Multivariate statistical analyses (PCA, LDA) and cluster analysis were performed on geochemical records.

The sediments deposited during the cold and warm period of Lateglacial and Early Holocene showed significantly different chemical compositions. The results indicate that the detailed geochemical analysis on the sediment has the potential to reflect past climatic conditions.