The effect of chemical pretreatment on grain size results of past and recent clastic sediments

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Laser diffraction grain size data have been widely used in paleoenvironmental reconstructions as physicochemical alteration-related proxies. Many studies are available on comparison of different laser diffraction devices, optical theories and optical settings. The ignorance of some uncertainty factors can lead to poorly comparable granulometric datasets. Other important factor leading to the aforementioned effect is the inadequate chemical pretreatment procedures which are often overlooked, but are capable to basically affect the results. In this study we examine a few past and recent sediment types from different geomorphological environments from the Carpathian Basin: lake and fluvial sediments, paleosols and loess. Our aim is to review and create a reliable methodology for laser diffraction particle size analysis and optical particle shape investigations. We compare widely used pretreatment methods - which can be found in the literature - with each other. We are also taking into account that different sediment types need different pretreatment methods. We can state that the duration of chemical pretreatment can affect the optical properties (color), the texture and the mineral composition of the sediments, as well as the size and shape of mineral particles in the samples. The changes in these significant parameters can mislead the researcher's main objectives. The study is supported by the ÚNKP-19-3 New National Excellence Program of the Ministry for Innovation and Technology. Support of the National Research, Development and Innovation Office NKFIH K120620 is gratefully acknowledged.