

NEW APPROACH TO ANALYSING GRAIN SIZE DISTRIBUTION IN COARSE-GRAINED SEDIMENTS

Grain size distribution analysis is one of the basic methods of examining sediments in geomorphology and geology. It consists in dividing the sediment into fractions which contain grains of different size and determining their percentage content. It is conducted in order to discover the characteristic features of the sediment and a possibly reliable reconstruction of the conditions of their transport and accumulation. Currently, there is a strongly felt need for an efficient and precise method for analysing grain size distribution in coarse sediments (coarser than sand) which would provide a comparable precision of measurement for the remaining fractions: sands, silts and clays.

Having encountered this problem in the author's own research, it was decided to attempt at a modification of the existing methods that would make them less labour-intensive and time-consuming. The aim of the project is to develop and verify a modified method for analysing grain size distribution in sediments which contain boulders and coarse gravels as well as the finest fractions. The proposed method will be a modification and combination of two methods. The content of boulders and gravels will be determined on the basis of automated grain sizing in Digital Gravelometer software, which will analyse photographic images taken at outcrops of sediments. The software analyses the surface of the photograph, isolates individual rock fragments and determines their size. Sediments which are too fine-grained to be determined on the basis of images will be screened with the use of a sieve set for the so called sieve analysis. Combining the results will allow for the entire spectrum of grain sizes which make up the sediment to be determined. Results obtained using the modified method will be verified by means of traditional methods which involve direct measurements and weighing of all the fractions of the sediment.

Developing a grain size distribution method for poorly sorted coarse sediments would allow for a considerable increase of the number of samples taken, a greater precision of analyses and, consequently, their interpretation, while reducing the required amount of time and labour.