



## **Comparing sedimentation methods and laser diffraction against an independent optical method**

Francesco Morari (1), Marco Bittelli (2), Costanza Andrenelli (3), Gianluca Simonetti (1), Sergio Pellegrini (3), Gilberto Artioli (4), and Ilaria Piccoli (1)

(1) Department of Agronomy, Food, Natural resources, Animals and Environment, University of Padova, Italy (francesco.morari@unipd.it), (2) Department of Agricultural Sciences, University of Bologna, Italy, (3) Council for Agricultural Research and Economics, Research Center for Agrobiological and Pedology, Firenze, Italy., (4) Department of Geosciences, University of Padova, Italy

For many years papers have been published showing differences between sedimentation-based methods against laser diffraction. Differences were found especially in the fine texture ranges and regression equations were presented to convert data obtained between different methods. In this paper we aimed at understanding which method is closer to an independent measurement of particle size. We selected a new, automated image analysis technique as a reference method. Since with this new method each individual particle is photographed, its pixels counted and its shape analysed, we assumed this method as the reference method against which test the accuracy of sedimentation methods and laser diffraction. Comparison showed that laser diffraction was in better agreement with the independent optical methods, indicating that the sedimentation methods tend to largely overestimate the finer fractions of the distribution. Considering the results presented in this research, and the methodological disadvantages of sedimentation methods, we propose to employ laser diffraction as a standard method for particle size analysis in soils.