

## GRANULOMETRIC COMPOSITION AS A PREDICTOR OF PEDOTRANSFER FUNCTIONS: USE OF LASER DIFFRACTION AND SEDIMENTOMETRIC METHODS

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Granulometric composition (or Particle size distribution, PSD) is the main predictor variable used in Pedotransfer functions (PTFs). A specialized database with PSD data is required to justify the PTF. These databases contain of PSD measured by sedimentation methods (pipette, hydrometer, etc). Recently Laser Diffraction Method (LDM) is widely used to ascertain a PSD. There are significant differences between sedimentation and LDM: sedimentation methods determine higher values of PSD fine grain fractions (silt, clay) due to the distribution of the solid phase density in different granulometric fractions and their different origins and composition. In heavy clay soils with high organic matter content, the differences may reach several times that can cause serious errors in the PTF determination and use. The aim of the paper is to validate the use of PSD measured by LDM to estimate soil water and heat flow by using PTFs. Soil saturated hydraulic conductivity (KS), and soil thermal diffusivity (KD) are measured for Umbric Albeluvisols Abruptic (WRB, 2006) by the direct method and by PTFs methods. PTFs are calculated based on PSD measured by LDM and by PM. Saturated hydraulic conductivity (KSPM), (KSLDM), and soil thermal diffusivity (KPM), (KLDM) are obtained by PM and LDM, respectively. The results observed that R<sup>2</sup> for KSPM 0.94 and KPM 0.90 were higher than KSLDM 0.855 and KLDM 0.835. However, RMSE for KSLDM  $2.4 \times 10^{-6}$  and KLDM  $9.3 \times 10^{-8}$  were lower than KSPM  $2.6 \times 10^{-6}$  and KPM,  $9.98 \times 10^{-8}$ , respectively. LDM technique is the powerful method for measuring particle size measurement and can be successfully used for estimation hydraulic properties and thermal parameters for Silty Clay loam and lighter soils, using PTFs without any modification or recalculation.