

New approach in comparative study of laser granulometry and hydrometry results, in fine -grained sediments (Case study: Loess of Golestan province)

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Abstract

Loess deposits are unconsolidated sediments with mainly coarse silt, without stratification with high permeability that are mostly yellow to light brown colour. Golestan Province in northeast of Iran is one of broadest loess area in Iran that connects loesses of middle asia to urasia. In this research, texture characteristics and quantity of silt, sand and clay are compared in 2 methods (sieve- hydrometry and laser diffractometry), in 16 sampling station. Data correlation in particle measurements between sand, silt and clay in these methods are a bit different. There is weak correlation between sieve- hydrometry and laser, in loess sediments of the study area; except sand, there are very weak correlation between silt and clay that can be realated to different measurement methods. Analysis of hydrometry is based on speed of sediment deposition particles and settling velocity is assumed to be constant, density of particles is considered equal to quartz and particles are considered spherical and smooth. Results shows that the amount of clay particles in hydrometry method are much more than laser method, which is related to different mineralogy of clays. This causes overestimation of platy particles in hydrometry method. Laser particle sizer measures medium particle diameter but sieve shows large particle diameter. This is the reason of different measurements between sand size sediments.

Keywords: Loess, Sieve- Hydrometry, Laser Granulometry, Golestan