



Soil properties controlling infiltration in volcanic soils

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Soil water infiltration is an important process whose behaviour depends on external factors and soil properties that vary depending on the type of soil. The soil parameters affecting the infiltration capacity of six soil orders all formed on volcanic materials (andisols, vertisols, alfisols, aridisols, inceptisols, and entisols) and contribute to the differences between them were studied in this paper. A total of 108 sites were selected on the island of Tenerife (Spain). The main soil properties were analysed and the steady-state infiltration rate measured using a double-ring infiltrometer. The relationship between the soil properties and infiltration was modelled using statistical Principal Components Analysis and regressions. The research concludes that the relation between structural development and texture play a decisive role. The high structural development of non-vitric andisols, due to the high organic matter and short-range-order mineral content, leads to an extremely fast infiltration rate. The structural instability and fine texture of aridisols produce low infiltration. In less developed soils (entisols and vitric andisols) where aggregate formation is minimal or non-existent, the coarse grain size is the relevant factor determining their very fast and extremely fast infiltration. In vertisols and alfisols, which have strong aggregation but low stability, clay type and content play an important role and lead to a moderate and moderately fast steady-state infiltration rate, respectively. In the most typic inceptisols, with moderate structural development and stability, the balance of the properties is largely responsible for the intermediate infiltration rate observed.