



## **The relationship between hydrodynamic properties and weathering of soils derived from volcanic rocks, Galapagos Islands (Ecuador)**

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The Galapagos islands are of recent volcanic origin and their soils are characterized by a diversity of structure. The potentially high water retention and buffering capacity of soils give them a key role in the islands hydrological cycle. Due to increased land use change and anthropisation, the Galapagos archipelago is subjected to water resource problems. Two islands were chosen to study the hydrodynamic properties of soils and their relationship with mineralogical composition. These are the central island of Santa Cruz and the eastern island of San Cristobal. Nine soil profiles were sampled and studied, using in-situ and laboratory methods for measuring physical properties (hydraulic conductivity, macroporosity) and XRD-techniques. Results show a relationship between hydrodynamic properties and mineralogical composition. Major differences were found between two types of soils. The first group consists of soils located in altitude ( $> 350$  m a.s.l.) which are characterized by low hydraulic conductivity ( $< 10^{-5}$  m s $^{-1}$ ) and low macroporosity ( $< 25$  %). These soils are thick and homogeneous without coarse elements. The clay fraction of these soils is important with dominance of gibbsite formed by intensive weathering of parent material, i.e. volcanic ashes or basaltic flows. The second group includes soils located in the low parts of the islands ( $< 300$  m a.s.l.). These soils are characterized by high hydraulic conductivity ( $> 10^{-3}$  m s $^{-1}$ ) and high macroporosity ( $> 35$  %). Structure of these soils is heterogeneous with coarse elements associated. This difference in physical properties of soils is in good agreement with the altitude variation of rainfall : it rains averagely three times more at 500 m a.s.l. than at the coast. Thus, main factor for soil development in Galapagos seems to be altitude and quantity of rainfalls, the alteration products constraining physical properties of soils.