

FUNCTIONING OF A SMALL EXPERIMENTAL WATERSHED IN THE SERRA DO MAR, BRAZIL. THE NEED OF A MULTIDISCIPLINARY APPROACH.

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RESUMO

In the Serra do Mar region, in southeastern Brazil, few is known about the flows into the soil cover. A good understanding of these flows is however essential for better management of (i) the water that supplies the highly populated Paraíba valley and the City of Rio de Janeiro, and (ii) the widespread landslide processes that are likely related to the slope feature. The analysis of a database of seven years of rainfall-discharge makes it possible to highlight the temporary storage of water into the soil cover of an elementary watershed. A structural analysis of the slope morphology revealed that the soil mantle is mainly characterized by (i) a gibbsitic saprolite, (ii) various kalinitic horizons within the ibbsitic material, (iii) kaolinito-gibbsitic topsoil horizons. The morphology and dynamics of this soil cover are discussed according to the thermodynamic stability of gibbsite and kaolinite acompnying the solution percolation through soil profiles. The physical features of the soil indicate that water is retained briefly within a microaggregated horizon during intensive rainfall. Because of the inclination of kaolinite compact horizon, any excess water within it flows laterally downslope and accumulates in the lowest part of the slope. This leads to landslipping, the main process of landform development in the region. The organization of the soil cover along the slope allows to identify two main water reservoir, one superficial, which chemical composition is likely in agreement with the kaolinitic and organic environment and the other one deeper, and likely at the equilibrium with the gibbsite. The next research should be focused on the identification of the geochemical signature of each reservoir and their contribution to the waterflow at the watershed at the scale of the year and of the rainy event.