



Sensitivity analysis of hydrological modeled responses to soil parameters in a watershed located in Serra do Mar, Brazil

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Hydrological simulations are very important in Serra do Mar due its strategic importance to the sustainable development, because of the remaining portions of the Mata Atlântica (the native tropical forest), and the railways, highways, fuel pipelines crossing the region, linking important cities to the Atlantic Ocean. However, this region suffers from frequent landslides, extreme rains and floods that result serious economical and social damages. These events have hydrometeorological causes in addition to the strong slope of the hills and the significant human interference. Bocaina catchment is part of Serra do Mar and cover an area of around 250 km² in northeast state of São Paulo, Brazil. This research aims at analyzing the hydrological responses sensitivity to soil parameters, applying the Distributed Hydrology Soil Vegetation Model (DHSVM) in Bocaina watershed. Developed in University of Washington, DHSVM is a physically based deterministic model that explicitly represents the effects of topography and vegetation on water fluxes through the landscape. The spatial resolution in these simulations was 100 m with a 3 hours time step. As spatial input data, the model requires also a digital elevation model, streams, vegetation and roads information. Temporal inputs data are precipitation, air temperature, humidity, wind speed, incoming shortwave and longwave radiation. The soil parameters analyzed are lateral hydraulic conductivity and its exponential decrease with depth, infiltration, surface albedo, porosity, pore size distribution, bubbling pressure, field capacity, wilting point, bulk density, vertical conductivity, thermal conductivity and thermal capacity. The selected cases were from 17.07.2004 up to 20.07.2004 and from 22.02.2204 up to 24.02.2204, when a heavy and continuous precipitation reached the region. The results show that lateral hydraulic conductivity is decisive to obtain better simulations.