

HYDROLOGICAL PROCESSES AT TWO SUBTROPICAL FOREST CATCHMENTS:  
THE SERRA DO MAR, SÃO PAULO, BRAZIL.

FUJIEDA, M.; KUDOH, T.; CICCIO, V.; CARVALHO, J. L. Hydrological processes at two subtropical forest catchments: the Serra do Mar, São Paulo, Brazil. **Journal of Hydrology**, Amsterdam, v. 196, p. 26-46, 1997.

RESUMO

The Cunha Forest Hydrological Laboratory was established in the Serra do Mar, São Paulo, Brazil, to achieve some understanding of the hydrological processes and the effects of forest cover on these processes in the headwater areas. Stream-gauging from two subtropical forest catchments (56.0 ha and 36.7 ha) covered with the Mata Atlântica commenced in 1982. Measurements of crown interception, surface runoff from a hillslope and estimation of soil water storage within the catchments quantified individual components of the hydrological processes. Ten years of field measurements and hydrograph analysis show that about 15% of annual rainfall is intercepted by the forest cover and returns directly to the atmosphere while 85% of the rainfall reaches the forest floor, where it infiltrates and remains in the soil to feed subsurface flow and baseflow or transpiration. Humid conditions obtain throughout the year and surface runoff is a rare occurrence on forested hillslopes. Stormflow is generated from wetland source areas adjacent to streams and from seepage from hillslopes. The total volume of stormflow is only 11% of annual rainfall. Fifty-nine % of annual rainfall is stored in the soil mantle and flows via subsurface routes to streams as baseflow throughout the year. This sustained flow of streams is one of the most important hydrological features and is controlled by such basin characteristics as the physical properties of the soil, the depth of the soil mantle and the vegetative cover. Soil evaporation and transpiration were estimated as 15% of annual rainfall by the water balance equation. Thus, the annual hydrological budget for the catchments is 70% streamflow and 30% evapotranspiration. Riparian areas are also places of stormflow production as well as of soil water and groundwater storage of water derived from hillslopes as interflow. An assessment of the area, depth of sediment and porosity of the riparian areas helps in understanding the runoff processes in low-order catchments in the Serra do Mar.