Processes of streamflow generation in a headwater catchment in central Amazonia.

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ABSTRACT

A 5 km2 headwater catchment in terra firme forest close to the Manaus k34 eddyflux tower has been instrumented to measure the components of the water, carbon and nutrient balances. This paper concentrates on the hydrological aspects: the processes by which streamflow is generated, and the routes taken by the water arriving in the stream. The variables being measured are: rainfall (4 locations), evaporation flux, throughfall, soil moisture storage (to 4.8m) and groundwater level along a toposequence, and streamflow. Data collection began in December 2001. The response of streamflow to rainfall is very rapid, indicating that stormflow peaks are generated from the valley floor areas, where the water table is close to the surface. Peaks in DOC concentrations confirm the valley floor as the source of the stormflow – DOC concentrations in the groundwater beneath the hillslope are very low. The groundwater level response to rainfall at different positions in the toposequence changes as the season progresses because the arrival of recharge from the plateau and slope areas is delayed by the travel time through the deep unsaturated zone. Late in the wet season, the discharge of groundwater from beneath the plateau and slope areas begins to dominate the water table behaviour in the valley floor. The water balance is being calculated on a daily basis to attempt to quantify storage in the deep unsaturated zone and groundwater. Data collection is still at an early stage, but important results are emerging. These are important in understanding the carbon balance.