

## **Differences in stream responsiveness between a tropical montane cloud forest and a tropical lowland rainforest**

### **ABSTRACT**

Tropical Montane Cloud Forests (TMCF) have unique hydrology considering their high moisture, steep headwater terrain, shallow soils, frequent precipitation, and the presence of horizontal precipitation. While the hydrology of Tropical Lowland Rainforests (TLRF) has been given due attention, TMCF in Malaysia have been less explored. This study compares stream responsiveness and peak flow dynamics between TLRF (substation Inobong, 5.33 ha) and TMCF (substation Alab, 8.53 ha) in Crocker Range, Sabah, Malaysia. Streams in both study site were instrumented with water level sensors and dataloggers, and meteorological stations that records data at 10-minute intervals. Two hydrograph metrics namely  $T_{res}$  (time taken from start of precipitation to hydrograph initiation) and  $T_{peak}$  (time taken from start of hydrograph response to peak discharge) were assessed via a combination of the Mann-Whitney test and ANCOVA. TMCF took a longer time to achieve peak water level (mean  $T_{peak}$ =143 mins) compared to TLRF (mean  $T_{peak}$ =118 mins). Average rainfall intensity ( $P_i$ ) was negatively correlated with  $T_{peak}$ .  $T_{res}$  was higher in TMCF (mean=141 mins) than in TLRF (mean=51 mins) and was not affected by  $P$  or  $P_i$ . Understanding such hydrological dynamics in TMCF is important for better headwater resource management and for flood prevention.