Assessing Rainfall Variability and Runoff Characteristics in the Weany Creek Catchment, Queensland, Australia

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A significant threat to the health of the Great Barrier Reef (GBR) is the large amount of runoff and sediment discharging from tributary catchments. Runoff and water quality are related to issues such as soil degradation, erosion, sediment and nutrient discharge. The Weany Creek catchment sits within the Burdekin basin in Queensland, which has been identified as one of the main sources of runoff and sediment to the GBR. The high spatial and temporal variability of rainfall has also been recognised as an overriding characteristic of the region. Intense rainfall is the main driver of runoff in dryland savannah ecosystems in north-eastern Queensland. Understanding the role of rainfall in contributing to runoff is necessary for land management applications. Whilst there is a broad research base on this topic, few studies have explored rainfall trends over fine spatial and temporal scales, particularly in north-eastern Australia. This has ultimately impacted on the understanding of runoff processes. The research explores the role of rainfall variability in contributing to runoff generation in a typical grazed savanna catchment (Weany Creek) by describing the spatial and temporal variability of rainfall in the region using recorded rainfall events from multiple gauging stations. A lumped hydrological model (HEC-HMS) is used to identify the relationship between rainfall variability and runoff for different land surface conditions. Results show that rainfall with highly variable and complex patterns significantly influences runoff generation processes even in small sub-catchments (13.6 km2). By using a rainfall-runoff model, the effect of rainfall variability on runoff can be better understood and will improve runoff estimations. This knowledge can enhance the understanding of rainfall-runoff processes and can consequently contribute to improved management of the limited water and soil resources of the dry savanna region.