Geophysical Research Abstracts
Vol. 16, EGU2014-14873, 2014
EGU General Assembly 2014

Effects of reforesting degraded grassland on hydrological flow pathways on Leyte, the Philippines

Ilja van Meerveld, Jun Zhang, and Sampurno Bruijnzeel

VU University Amsterdam, Faculty of Earth and Life Sciences, Critical Zone Hydrology Group, Amsterdam, Netherlands (ilja.van.meerveld@vu.nl)

Reforestation of degraded land in the tropics is promoted for a wide range of expected benefits, including carbon sequestration and streamflow regulation. However, how reforestation of degraded land affects runoff generation mechanisms and catchment water yield is still poorly understood as most experimental work pertains to non-degraded terrain. We set out to study the differences in hydrological functioning of a small degraded grassland catchment and a similar catchment that was reforested 15 years ago. Both catchments are located near Tacloban, Leyte, the Philippines. Stream stage, EC and temperature are measured continuously since June 2013. Precipitation, soil moisture content, and groundwater levels are monitored as well. Samples are taken from streamflow, precipitation, groundwater, and soil water prior to and during rainfall events for geochemical and stable isotope analysis to elucidate source contributions to storm runoff. Streamflow and event water contributions increase rapidly during almost every rainfall event in the grassland. In the reforested catchment, event water contributions to streamflow are much smaller and only increase during large events. These tracer results suggest that overland flow occurs much less frequently and is much less widespread in the reforested catchment compared to the grassland catchment. Our results thus indicate that the dominant flow pathways have changed as a result of reforestation and suggest that reforestation can largely restore the hydrological functioning of degraded sites if the forest is allowed to develop over a sufficiently long period without subsequent disturbance.