AGU FALL MEETING
San Francisco | 15–19 December 2014

H21F-0794: Seasonal isotope hydrology of a coffee agroforestry watershed in Costa Rica

Tuesday, 16 December 2014
08:00 AM - 12:20 PM
Moscone West - Not an Option

- ePoster - AGU_isotopes_poster_2014_reduced.pdf

Improved information of seasonal variations in watershed hydrology in the tropics can strengthen models and understanding of hydrology of these areas. Seasonality in the tropics produces rainy seasons versus dry seasons, leading to different hydrologic and water quality processes throughout the year. We questioned whether stable isotopes in water can be used to trace the seasonality in this region, despite experiencing a “drier” season, such as in a Tropical Humid location. This study examines the fluctuations of stable isotope compositions ($\delta^{18}O$ and δD) in water balance components in a small (<1 km^2) coffee agroforestry watershed located in central Costa Rica on the Caribbean side. Samples were collected in precipitation, groundwater, and stream water for more than two years, across seasons and at an hourly frequency during storm events to better characterize spatial and temporal variations of the isotopic composition and of the respective contribution of surface and deeper groundwater to streamflow in the watershed. Isotope composition in precipitation ranged from -18.5 to -0.3‰ ($\partial 18O$) and -136.4 to 13.7‰ (∂D), and data indicate that atmospheric moisture cycling plays an important role in this region. A distinct seasonality was observed in monthly-averaged data between enriched dry season events as compared with the rainy season events. Streamflow data indicate that a deep groundwater system contributes significantly to baseflow, although a shallow, spring-driven system also contributes to stream water within the watershed. During storm events, precipitation contributes to stormflow in the short-term, confirming the role of superficial runoff. These results indicate that isotopes are helpful to partition the water balance even in a Tropical Humid situation where the rainfall seasonality is weak.

Authors

Jan Boll
Univ Idaho

Olivier Roupsard
CIRAD & CATIE

Kristen Welsh Unwala *
Univ Idaho

Find Similar

View Related Events

Day: Tuesday, 16 December 2014