JAMES COOK UNIVERSITY
AUSTRALIA

NATIONAL CENTRE FOR
GROUNDWATER RESEARCH AND TRAINING

11th Australasian Environmental Isotope Conference
and
4th Australasian Hydrogeology Research Conference

PROGRAMME AND ABSTRACTS

Rydges Tradewinds, Cairns

July 12–14, 2011

Daintree Rainforest Observatory, Cape Tribulation

Fluvial dynamics of dissolved and particulate organic carbon during periodic one-flood events in a steep tropical rainforest catchment

Bass, A M [1], Bird, M I [1], and Liddell, M J [1], and Nelson, P [1]

[1] James Cook University, Cairns, Australia

adrian.bass@jcu.edu.au

In small catchments with rapid flood pulses, detailed temporal data is essential as high discharge events can be measured in hours and days, rather than weeks and months. Using high resolution (15 minutes) sampling procedures, we studied the dynamics of aquatic dissolved and particulate organic carbon (DOC and POC) export through episodic discharge events in a small pristine rainforest catchment in north-east Australia between November 2009 and March 2010. The concentration of DOC and POC peaked during times of high stream discharge, reflecting an increased mobilisation of soil water carbon stocks. DOC was the major form of organic carbon in the stream, over 70% of the total carbon export. 84% of the total organic carbon exported from the catchment occurred during significant discharge events (discharge >50 L s-1) measured during 9% of the study. Export of DOC and POC totalled 195 and 68 kg km-2 month-1, respectively, with a DOC:POC ratio of 2.9 ± 0.9. If this sub-catchment was sampled at weekly intervals the lateral export of carbon would have been underestimated by between 49% and 78% for DOC and POC, respectively. Preliminary δ^{13}C and molar C:N values of the dissolved and particulate matter which suggested that during discharge events less microbially processed material from the upper soil layers dominated organic matter export, with the opposite being true in non-flood conditions. Not only will the quantities of organic matter exported change in different discharge conditions, but the source and quality may also shift.