

### III LBA Scientific Conference, July 27-29, 2004, Brasília, Brazil

**Title:**

Internal and external fluxes of dissolved organic carbon in forested headwater Amazonian catchments: Near-surface and aboveground controls on DOC exports

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**Abstract:**

Fluxes of dissolved organic carbon (DOC) were determined for throughfall, surface runoff, leaching water, groundwater seeps, and stream water during base and storm flows in four headwater catchments in an undisturbed forest near Jurueña, Mato Grosso in the seasonally dry, southern Amazon. During the dry-to-wet season transition, DOC concentrations in overland flow were found to decrease from  $53.8 \pm 18.1 \text{ mg L}^{-1}$  at the beginning of the rainy season to  $13.7 \pm 4.8 \text{ mg L}^{-1}$  by the middle of the rainy season (avg. value of all watersheds  $\pm 1$  std. dev.). Throughfall concentrations also decreased during this period from  $16.3 \pm 1.0$  to  $5.5 \pm 1.1 \text{ mg L}^{-1}$ . Stream flow DOC concentrations from weekly grab-samples of the four streams decreased over the period of study from  $4.43 \pm 1.45$  to  $1.57 \pm 0.19 \text{ mg L}^{-1}$ . Groundwater seep DOC concentrations were found to be relatively constant.

The seasonality of these forests appears to be the driving factor resulting in the temporal variability of DOC concentrations observed. The leaching out of the dry season litterfall and new leaf growth following the first rains supplies fresh DOC to streams via throughfall and surface runoff, while DOC in infiltrating water is subjected to sorption within the profile. This leachate decreased in concentration from about  $7 \text{ mg L}^{-1}$  at 10 cm depth to concentrations of about  $0.2 \text{ mg L}^{-1}$  in emergent groundwater.

Storm flow was sampled at discharges approximately 5 times and 10 time base flow discharges. DOC concentrations in storm flow samples were consistently higher than base flow, with DOC concentrations on average five times higher than base flow. Considering the differences between DOC values for base flow and storm flow in light of the tremendous differences between DOC in surface runoff and groundwater indicates an important coupling of surficial processes with exports of DOC from headwater catchments.

**Presentation Type:** Poster