

## **The role of dissolved organic carbon, dissolved organic nitrogen and dissolved inorganic nitrogen in a tropical wet forest ecosystem**

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### **Abstract**

Although tropical wet forests play an important role in the global carbon and nitrogen cycle, little information is available about the origin, composition and fate of dissolved organic carbon and nitrogen in these ecosystems. We quantified and characterized fluxes of dissolved organic carbon (DOC), dissolved organic nitrogen (DON) and dissolved inorganic nitrogen (DIN) in throughfall, litter leachate and soil solution of an old-growth tropical wetforest to examine their contribution to C stabilization (DOC) and to nitrogen export (DON and DIN) from this ecosystem. We found that the forest canopy was a major source of DOC ( $232 \text{ kg C ha}^{-1} \text{ yr}^{-1}$ ). Dissolved organic carbon fluxes decreased with soil depth from  $277 \text{ kg C ha}^{-1} \text{ yr}^{-1}$  below the litter layer to around  $50 \text{ kg C ha}^{-1} \text{ yr}^{-1}$  between 0.75 and 3.5 m depth. Laboratory experiments to quantify biodegradable DOC and DON, and to estimate the DOC sorption capacity of the soil combined with chemical analyses of DOC, revealed that sorption was the dominant process controlling the observed DOC profiles in the soil. This sorption of DOC by the soil matrix has probably led to large soil organic carbon stores, especially below the rooting zone. Dissolved N fluxes in all strata were dominated by mineral N (mainly  $\text{NO}_3^-$ ). The dominance of  $\text{NO}_3^-$  relative to the total amount of nitrogen leaching from the soil shows that  $\text{NO}_3^-$  is not only dominant in forest ecosystems receiving large anthropogenic nitrogen inputs, but also in this old-growth forest ecosystem which is not nitrogen limited.