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Contrasting biogeochemical characteristics of right-bank tributaries of the Oubangui River, and a comparison with the mainstem river (Congo basin, Central African Republic).

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The Oubangui is a major right-bank tributary of the Congo River, draining an area of $\sim$500,000 km^2 of mainly wooded savannahs. Here, we describe data on the physico-chemical characteristics and biogeochemistry of contrasting tributaries within the central Oubangui catchment collected during 3 field surveys between 2010 and 2012, with land use ranging from wooded savannahs to humid tropical rainforest. Compared to data from two years of sampling at high temporal resolution on the mainstem river in Bangui (Central African Republic), these tributaries show a remarkably wide range of biogeochemical signatures, from highly diluted blackwaters (low turbidity, pH, conductivity and total alkalinity (TA)) in rivers draining dense rainforests to those more typical for (sub)tropical savannah systems. Based on carbon stable isotope data (δ13C), the majority of sites show a corresponding dominance of C3-derived organic matter, with a tendency for increased C4 contributions the more turbid sites such as the Mpoko River. δ13C of dissolved organic carbon (DOC) were generally similar to those of particulate organic carbon (POC) across the different tributaries. δ13C of dissolved inorganic carbon (DIC) ranged between -28.1 ‰ in low-TA rainforest (blackwater) rivers to -5.8 ‰ in the mainstem Oubangui. These variations were strongly correlated to both partial pressure of CO_2 (pCO_2) and to the estimated contribution of carbonate weathering to total alkalinity, suggesting an important control of the dominant weathering regime (silicate versus carbonate weathering) on DIC and CO_2 fluxes. All tributaries were consistently oversaturated in dissolved greenhouse gases (CH4, N2O, and CO_2) with respect to atmospheric equilibrium, with highest levels observed in rivers draining rainforest vegetation. The high diversity observed within this subcatchment of the Congo River basin is equivalent to that observed in much larger, heterogeneous catchments, and underscores the importance of sampling at the wider scale, covering the variability in subcatchment characteristics, to improve our understanding of biogeochemical cycling in the Congo Basin.