The Experimental Flow to the Colorado River Delta: Effects on Carbon Cycling

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Temporarily dry waterways may have an important impact on carbon budgets in arid regions, largely due to their unexpectedly high greenhouse gas (GHG) emissions. Here we report on the effects on the carbon dynamics of an experimental flood in the dry watercourse of the Colorado River in Mexico. We observed significant post-flood differences in the degree of decay, age, and concentration of dissolved organic carbon (DOC), as well as dissolved CH_4 and CO_2 concentrations, between sites that were truly dry versus those that had pooled water prior to the flood. Our results indicate that this flooded waterway was likely a large source of CH_4 and CO_2 to the atmosphere, and that DOC age increased with time of flooding. One motivating factor for this controlled flood event was the redistribution and restoration of native plant species along the riparian zone of the dry riverbed. This is important to consider when assessing the overall impact of such an event. For example, although we observed a large release of CO_2 during the flooding, it is possible that regrowth of restored terrestrial plant species will largely offset the rapid pulse of greenhouse gases.