



New wetland forcing files improve the simulation of river discharge, inundation and inland water CO₂ emissions in the Amazon Basin with the ORCHILEAK model

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The model ORCHILEAK (Lauerwald et al., 2017), a new branch of ORCHIDEE (Organising Carbon and Hydrology in Dynamic Ecosystems), the land surface scheme of the Institut Pierre Simon Laplace ESM, represents the seasonality of floodplain inundation and CO₂ emissions from the water surface in the Amazon Basin fairly well, while the total extent of floodplains and wetlands is still underestimated due to the nature forcing files used. Here, we derive new, more detailed and highly resolved floodplain and wetland forcing files from recently developed remotely sensed wetland products in the tropics (Hess et al., 2015; Gumbrecht et al., 2017). As a result, the maximal floodable proportion of the Amazon as represented in the forcing files increases from approximately 10% to 15%, and the reproduction of the observed hydrological dynamics improves at some gauging stations. In turn, simulated total annual average CO₂ evasion (from 1980-2000) from the Amazon aquatic system (floodplains and rivers combined) increases significantly.