



Changes in the Amazon and Brazilian Cerrado's water resources due to land use change in the last 40 years

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Understanding how land use change can affect natural dynamics of water resources in Amazon and Brazilian Cerrado is of importance due to the constant pressure for deforestation suffered by these biomes. In this work, the dynamic vegetation model with river routing and flood dynamics INLAND-THMB (Integrated LAND Surface Model - Terrestrial Hydrology Model with Biogeochemistry) was used to simulate how land use change (LUC) can affect the water balance, river discharge and flood dynamics in the Amazon Basin and in Brazilian Cerrado. To achieve this goal, we performed simulations following the recent Global Carbon Budget Land modelling protocol (Trendy-v7) and compared the S2 (historical CO₂ and climate and time-invariant 1700 land use mask) and S3 (historical CO₂, climate and land use). Thus we can evaluate the effects of LUC keeping the information of dry and wet events during the period. To better represent the land use state in S3 simulation, we compiled deforestation information from the PRODES/INPE project in the Brazilian Amazon and Cerrado and produced a map with remaining natural area for each year. The evaluation was performed to each biome separately and also in some of their sub-basins. In the Amazon, we looked at the upstream Amazon Basin (Alto Solimões), which includes an area with very low LUC, and at the Madeira, Tapajós and Xingu all in the arc of deforestation and in Cerrado at Tocantins Basin. Preliminary results show higher river discharge related to LUC, as expected, and also less available water, since the ET decreases when we include anthropic changes in land cover in the model. It is important to highlight that this study did not include atmospheric feedbacks in the precipitation, which can mask some of the results, since considerable amount of the Amazon precipitation is provided by recycling as shown in previous studies.