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# Modeling the changing sediment yield of the Amazon under climate change and deforestation scenarios and the possible impacts on the Guiana coast

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The Amazon River is an important source of the sediment that is transported and accumulated along the coast of Suriname. As such it is an important factor in maintaining the coastline as this sediment is deposited in mud banks that move towards the shore and coalesce with it, thus preventing coastal erosion. Accordingly, a steady and adequate supply of sediment from the Amazon river is required especially considering increased coastal erosion rates that may occur as a result of rising sea levels due to climate change. Yet at the same time, climate change may alter the hydrological regime of the Amazon and influence its transport capacity, affecting sediment transport to the mouth and coast. Furthermore, the sediment supply to the river may be altered as a result of land cover changes and other anthropogenic activities, including deforestation and sediment trapping in existing and future planned reservoirs.
Studying the transport of sediment from source to sink and quantifying how future changes affect the mean rate of sediment supply to the Surinam coast and its variability will lead to a better understanding of the intricacies involved. We use a spatial-temporal process-based model together with a set of plausible scenarios of future change based on combinations of the Shared Socioeconomic Pathways (SSP) and the Representative Concentration Pathways (RCP). In this study, we used two models: PCRGLOB-Set and PCRGLOB-WB. PCRGLOB-SET is based on the RUSLE equation and is used to assess the local sediment supply including the effects of land cover changes. PCRGLOB-WB simulates hydrological responses and changes under climate and land-use change. Moreover, PCRGLOB-WB is used to determine the trapping efficiency of reservoirs. The PCRGLOB-WB model was applied to a business-as-usual scenario for the 21st century (SSP 2 with RCP 6.0) and we considered uncertainty in the projected climate by using 5 Global Climate Models (GCMs). We apply the model to different future scenarios considering climate, socioeconomic and land-use change. For validation, the observations of six stations along the Amazon river were compared to the estimations of the models for the historical period (1971-2010), which also serves as a reference run to evaluate changes in sediment production and sediment yield.