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Sediment dynamics in the Mekong basin- a multi-objective calibration on discharge and sediment load

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The Mekong delta is one of the most extensively used deltas world wide and provides natural resources to more than 17 million people. Environmental issues in the Mekong delta are closely linked to water usage and availability. In addition, the sediment input to the floodplains during the annual flood plays a crucial role in terms of nutrient supply to agriculture. Since flood magnitudes and sediment delivery are driven by human activities and hydrological processes along the entire Mekong river, it is highly important to assess the dynamics upstream of the Mekong delta. This study applies the hydrological model SWIM to the watershed upstream of Kratie/Cambodia with a size of approximately 650.000 km^2 and gives a quantitative depiction on the sediment and discharge dynamics. The model is driven by different, mostly globally available data sources. After the identification of the sensitive parameters, a multi objective calibration, namely the NSGA-II algorithm, is applied. The model simulates the discharge values well, e.g. by capturing the annual flood season and sediment dynamics. The next steps comprise an assessment of different sources of uncertainty that are incorporated in the model. This includes the climate input data and the sparsely available and highly variable sediment data. Eventually, the study shall provide a basis to examine the future developments along the Mekong river, for example, quantifying the impacts of potential reservoirs on the flow regime and sediment dynamics.