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Impacts of dams on the suspended sediment load in the Chinese part of the Mekong – a quantitative analysis by remote sensing

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The construction of dams alters the flow regime and suspended sediment dynamics of a river essentially. This is also the case in the Lancang, the Chinese part of the Mekong river. The impact of the cascade of dams has been reported in a number of papers, but because the actual measured data are not accessible after the closure of the first dam in the early 1990s, these analysis are either based on the first gauging station outside China only, or just provides aggregated numbers over long time periods. In order to fill this knowledge and data gap, a long time series of Landsat images of the Lancang was used to determine the nephelometric turbidity, which in turn is closely correlated to the suspended sediments. Turbidity is determined by the backward scattering of light between 450 to 800nm wave length. The Landsat scenes provided 7-10 images per year allowing for a low but continuous temporal coverage of the river reach upstream of the Dachaoshan and Xiaowan dam. This data collection and analysis of this kind is the first publicly available for this part of the river. From these images the turbidity, resp. the suspended sediment load was derived along the covered river reach. The temporal analysis the suspended sediment loads showed the impact of the dams in terms of reduction of the mean sediment load as well as the variability within the time spans between dam closures. Particularly the closure of the huge Xiaowan dam in 2010 caused a dramatic decline both before and after the dam.