



Analyzing Large-Scale Sediment Connectivity in a Central Asian Catchment Using Geospatial Datasets

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Estimations of sediment transport capacities and sediment connectivity are of high importance for water management at the catchment scale. Large-scale modelling techniques are helpful tools to give insights of such sediment budgets. However, these modelling techniques often require locally obtained characteristic values of the river sections, such as discharge measurements or river width values. Obtaining such information by in situ measurements or remote sensing data can get time- and cost-intensive, especially in remote and mountainous regions. Instead, several geospatial datasets with global coverage exist and can fill these gaps, if used adequately. We, therefore, adjusted the CASCADE model toolbox to work with freely available geospatial datasets as input parameters and exemplarily applied it to the Naryn River in Central Asia, which includes five artificial dam structures. The river characteristics such as slope and width were taken from the SWORD river database, and the hydrological information was taken from the Flo1K dataset. With the adjusted CASCADE model, we obtained information on sediment transport capacities in the catchment at the reach scale. As the model also accounts for sediment connectivity, we identified deposition- and erosion-prone areas and, therefore, localized sediment sinks and sediment sources in the catchment. The results showed that the large dams in the catchment influence the sediment budget significantly, for example by reducing the sediment transport capacities upstream, by trapping sediments in their reservoirs and by increasing the sediment entrainment downstream. Since sediment connectivity is an important parameter for ecosystem health and sustainable river management, such qualitative assessments of the sediment connectivity within large catchments can be helpful for prioritizing sediment management measures and be a basis for informed planning of more sustainable hydropower plants.