



Suspended sediment in a small catchment: sources, dynamics and physical characteristic

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In this paper we propose to study the suspended sediments in a small catchment, with regard to their origin, grain size and upstream - downstream transport, until they exit the catchment.

Our research has focused on the Gemenea river and catchment, as well as on its main tributary - Slătioara River. The catchment has an area of 77.7 km² and is located in the north-northeastern part of Romania, more specifically in Stânișoara Mountains. Geologically, Gemenea catchment overlaps two lithological units: the Mesozoic crystalline in the west (about 25.17% of its area) and flysch in the east. These two units behave differently when impacted by denudation processes. Although Gemenea catchment is 76% covered by forest, floods often occur in the area, thus altering floodplain morphology and inducing the transport of large quantities of sediment by suspension, saltation and traction.

Considering the connectivity between river network and slopes, the main sources of sediment are located where the banks of the river channel also function as valley slopes. Thus, in this study we proceeded with taking two sets of samples. The first set consists in collection of soil samples from river banks, seven soil samples from the Gemenea catchment and six soil samples from the River Slătioara banks respectively. The second set of samples refers to sampling suspended load from the two rivers. Samples were analyzed in the laboratory by sieving and pipetting. The results were weighted, summed and grouped into grain size categories and percentage of skeleton grains, sand, silt and clay.

We hereby briefly present the percentages for the particle size categories of Gemenea River and its tributary, Slătioara.

The analysis of suspended load highlights the contrast between Gemenea and Slătioara in what concerns the percentages of grain size categories: fine sand, silt and clay. While the river Gemenea shows decreasing percentages of fine sand, silt and clay, we note an opposite situation in the case of Slătioara. Of the total suspended load in Gemenea, fine sand comprises 50.4%, while clay only 13, 42%. A contrasting situation arises at Slătioara, with only 8.65% fine sand and 51.63% clay. Laboratory results indicate that the banks of Slătioara River contain a greater amount of clay compared to the banks of Gemenea. However, this situation is reversed downstream of the confluence between the two rivers.

Variation in the grain size of both suspended load and bank material is largely due to the different resistance of the two lithologies to weathering and erosion processes.

Based on the relations between the weights of clay fractions in suspended sediment and soils from corresponding catchments, the phenomenon of selective transportation has been highlighted. This was quantified by the parameter known as clay enrichment ratio of the sediment.

Regarding the degree of clay enrichment, the phenomenon has been well highlighted at Slătioara River, where we observed a doubling (51,63%) of this indicator. Conversely, the Gemenea River does not show - at this research stage - a selection of particle diameters along the sediment transportation network.

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