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SYMPOSIUM

MESURE DE L'EROSION ET DU TRANSPORT DES SEDIMENTS

LATE PAPERS
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4. - Experimental basin of the Rio delle Viole (working group: M. Pellegrini, G. Tosatti, L. Zarotti)

The Rio delle Viole basin is located in the lower Apennines near Reggio Emilia and it is a tributary of the Tresinaro which in turn flows out into the left side of the Secchia river.

It has a total area of 10.623 km^2, maximal lenght of 5.7 km and maximal width of 3.9 km. Its highest level is 527 m a.s.l. whereas its lowest level is 164 m a.s.l.. The 80% of the basin is made up mainly of clay material; the stony formation outcrops in discontinuous lenticular patterns along the water divide and in bands which cross the middle of the basin itself. Recent deposits are poorly represented and they are made up of landslide material with limited alluvial covers along the channel of the river's main axis. The large presence of mainly clay soil as well as the scanty and discontinuous vegetation cover, both result in marked erosion of the basin which in turn greatly affects the suspended transport in the river flow.

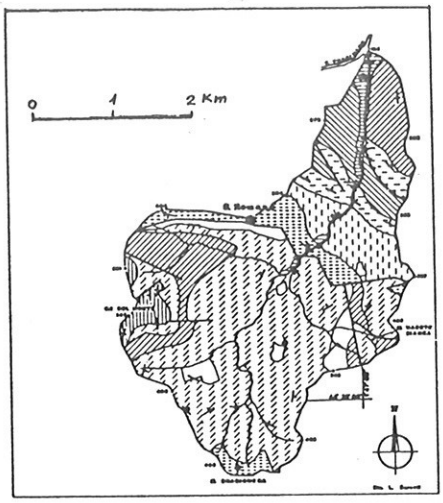

Fig. 6 - The Delle Viole creek basin (from [1]).

The hydrographic basin network is characterized by channels directly dug out of the substratum. Erosion and sediment transport phenomena, therefore, are common. Only in the terminal tract of the main axis an alluvial cover is constantly present even though it is presently undergoing re-modeling by the Rio delle Viole.

To the purpose of assessing the bed-load transport of the river flow, we have examined the bottom curve and eight cross sections of the stream selected for their position and morphology. The materials present in the channel were made identifiable by using different colours in the different river sections; over the 5 month period of observation in 1977 we observed that the channel material was completely removed and partly substituted immediately after removal. During the period April-September 1977, the bed-load transport was estimated at about 1211 m^3 as described in precedent works [1]. The observation period included spring floods, summer drought and the late-summer flood usually occurring in September.

The unit contribution of the basin to bed-load transport was 12 m^3/km^2 over the 5 month period of observation.

During the flood of September 2, 1977, when the peak flow was 83 m^3/s we recorded shifting of limestone material with a volume of up to 1 m^3 for a distance of 1.5 km. Most of the gravel, blocks and stone of a volume less than 1/4 m^3 located in the check points, where carried away into the Trasinaro river and than substituted by similar material coming from the upper zone of the basin. During the previous spring floods, the bed-load transport had been considerable even though the transport had obviously been far less as the result of a lower flow rate. The critical flow for bed-load transport, that is, the flow that allows the beginning of the phenomena has been evaluated equal to about 40 m^3/s.

References

[1] FERRETTI, P., MORATTI, L., PELLEGRINI, M. & ZAROTTI, L. (1978): "Il bacino sperimentale del Rio delle Viole (Appennino Emiliano): primi risultati". Mem. Soc. Geol. It., 19, 269-264.