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Sediment transport processes during flood events in the Middle Loire: gauging and first results

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A hydraulic and sediment transport survey campaign was organised in March 2007 on the middle reaches of River Loire, at the Bréhémont site. The aim was to collect data useful for the understanding of fluviomorphological mechanisms. A survey procedure, established at the end of the 1960's and relying on a follow-up bathymetric surveys and on ancient sediments samplers was combined with modern technologies such as DGPS satellite positioning and ADCP flow gauging. The survey campaign allowed quantifying the sediment transport rates of the size fractions larger than 50 microns. The results confirm the earlier made hypothesis concerning the existence of a sediment load moving close to the bottom and distinct from the suspended load as described in the theories. This load was called "morphological" and is composed of solids having sizes between those of the riverbed and those moving in suspension at higher elevations. This statement, made on the basis of surveys on other large streams in Africa, Asia and the America's questions the concepts on which have been based the majority of the sediment transport theories. The analysis shows also that the percentage of bed material load (bed load and near-bed transport) can amount up to 60% of the total load in some verticals and nearly 50% on the cross-section, that is much more than the percentage usually admitted. The present surveys show that campaigns as these are necessary in order to understand the processes, a condition prior to investigating solutions.