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Studying bed-load transport of tributaries to mitigate the Drôme bed degradation

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Bed-load sediment transport was studied in two steep streams, tributaries to the Drôme River located upstream of the city of Die. The objective was to quantify the solid material input to the Drôme river currently experiencing severe bed degradation. Data collected during about five years included water levels converted into liquid discharges and bed-load volumes for each flood event. Solid volumes were obtained through the chain method combined with transport distances of painted particles. Laboratory experiments were performed to acquire a better knowledge of the chain method giving crosswise eroded and deposited bed surfaces. No monotonous relationship between the solid discharge and the active layer was found. In particular, just above incipient motion, bedforms are responsible for greater crosswise bed surface disturbance than for larger discharges. However chain solid volume field data were satisfactorily compared with classical semi-empirical solid discharge formulas adapted for steep slopes.