The application of a parametric grey box type approach to investigate surface runoff and erosion during rainstorms: an erosion plot case study in Central Java, Indonesia

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Abstrak

By application of a parametric grey-box type approach runoff, soil-loss by runoff, infiltration and rainsplash have been monitored at bounded erosion plots. These plots were located at the Desel River catchment (Central-Java, Indonesia) and except for the land cover type the plot properties did not differ. Grass covered plots posses high infiltrability values. Surface runoff and rainsplash hardly occur. The soil covered by maize and cassava shows a final infiltration capacity of about 13 mm/h. During rainfall soil crust formation causes both a variable infiltration rate and a changing intensity of soil material transport by rainsplash. The yearly erosion rate by surface runoff amounts to 0.6 mm. Bare soils exhibit a final infiltrability value which varies from about 2 to 8 mm/h. The yearly surface lowering by overland flow reaches about 88. Rainsplash causes a yearly downslope transport of 279 grams of soil material for a slope segment of 1.0 wide. Extrapolation of the erosion plot data in a spatial sence results in a material yield of about 250 metric tons/year which is discharged from the Desel River basin.