

Bedload flux in southern Brazilian basalt scarp

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Abstract Frequently, to assess the life expectancy of Brazilian reservoirs, bedload flux has been estimated by using formulas (e.g. the Einstein equations) or by assuming that bedload represents a fixed percentage of the suspended load. This study was carried out to characterize the bedload flux on the basalt scarps of southern Brazil. The bedload was measured over the course of 12 stormflows. The results demonstrated that the bedload flux–streamflow relationship was adequately described by a potential mathematical function. Bedload flux selectively transported particles smaller than D_{50} surface and subsurface bedstream sediments. When considering the bedload flux–streamflow relationship, the flux ranged from a minimum of $0.24 \text{ g m}^{-1} \text{ s}^{-1}$ for a streamflow of $0.53 \text{ m}^3 \text{ s}^{-1}$ to a maximum of $44 \text{ g m}^{-1} \text{ s}^{-1}$ for a streamflow of $1.3 \text{ m}^3 \text{ s}^{-1}$. The percentage of bedload/suspended load varied between <1% up to 60%, and this variation was strongly associated with peak flow.

Key words bedload, step-pool streams; Maddock classification; reservoir life expectancy; Brazilian basalt scarps; hydropower