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Typical debris-flow barrier dams and associated outburst floods in the southeastern Tibet

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Large-magnitude debris flows up to a volume of 1.0 million m³ happen frequently in the southeastern margin of Tibetan plateau due to rapid rock uplift, high relief and abundant rainfall. These flows with high bulk density can easily block main rivers. Such debris-flow barrier dams fail very quickly, resulting in outburst floods and intensive sediment transport. We collect data of four recent large-scale debris-flow damming events at Peilong, Yigong, Tianmo and Sedongpu catchments, and examine the process of riverbank erosion and sediment transportation under dam narrowing and outburst flooding. More than 10% of debris mass was delivered downstream when the dams breached. It is concluded that debris flow is main erosion way in this area, and the very high erosion rate play a key role on river morphology in southeast Tibet.