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Large floods, alluvial overprint, and bedrock erosion

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Depending on their behaviour during extreme floods, streams can be divided into two distinct classes. 'Flood-cleaning' streams erode during high flows and deposit during small and medium flows. 'Flood-depositing' streams deposit during high flows and erode during small and medium flows. Rivers with a wide range of drainage areas and other characteristics can be classified as either 'flood-cleaning' or 'flood-depositing'. In bedrock channels, this behaviour can lead to a feedback effect, the 'overprint effect', between sediment transport processes and bedrock erosion, which can modulate long-term bedrock erosion rates. The 'overprint effect' arises when alluvium covers the bedrock and typical alluvial channel forms (e.g., meandering or braiding patterns, armour layers or bedforms) develop, which influence sediment transport rates. This effect may accelerate or decelerate sediment export from a reach, causing increased or decreased long-term bedrock erosion rates.