

## GEOMORPHOLOGIC EVOLUTION OF THE TEPHRA DEPOSIT FROM PARÍCUTIN VOLCANO, MEXICO

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The 1943–1952 eruption of Parícutin scoria cone, Mexico, produced a tephra-fall deposit with a reported volume of  $1.3 \text{ km}^3$  [ $0.31 \text{ mi}^3$ ]. Emplacement of pyroclastic deposits results in accelerated erosion and increased sediment yield in affected drainages. Published data for Parícutin show that the erosion rate peaked in 1944, with a relative sediment yield seven times greater than the average pre-eruption rate. Extrapolation of these data using a logarithmic curve fit indicates that the Parícutin area should have returned to a pre-eruption sediment yield by 1972. A sediment budget was devised for Parícutin fall deposits to demonstrate the mass-flux relationships for abstracted processes of annual sediment production, transport rate, tephra remobilization and dilution, and associated changes in sediment storage capacity. For this first-order approach, all erosive processes are combined into an annual measure of sediment production. Using this sediment budget technique with an erosion rate of  $10 \text{ m}^3\text{km}^{-2}\text{yr}^{-1}$  [ $915 \text{ ft}^3\text{mi}^{-2}\text{yr}^{-1}$ ] and a deposit area of  $58,682 \text{ km}^2$  [ $22,657 \text{ mi}^2$ ], less than 4 percent of the Parícutin tephra-fall deposit was eroded and redistributed between 1943–1972. Assuming a constant erosion rate, this model suggests at least 2,200 years of additional erosion is needed to remove the Parícutin fall deposit. This modeling approach has additional applications, including remobilization of possibly contaminated tephra from the potential high-level waste repository at Yucca Mountain, Nevada, USA.

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