The terraces of Petra, Jordan: archives of a lost agricultural hinterland

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Petra is hidden in rugged arid mountains prone to flash floods, while the dry climate and barren landscape seem hostile to cultivation. Nevertheless, there are countless remains of terraces of so far unknown purpose. We investigated three well-preserved terraces at Jabal Haroun to the southwest of Petra which seemed representative for the diverse geology and types of terraces. A hydrological model shows that the terraces were effective at both control of runoff and collection of water and sediments: they minimized flash floods and allowed for an agricultural use. However, rare extreme rainfall events could only be controlled to a limited degree, and drought years without floods caused crop failures. Pollen and phytoliths in the sediments attest to the past presence of well-watered fields including reservoirs storing collected runoff, which suggest a sophisticated irrigation system. In addition, faeces biomarkers and plant-available phosphorus indicate planned manuring. Ancient land use as documented by the terraces created a green oasis in the desert. They seem to represent Petra's agricultural hinterland, which was lost during the Islamic period due growing aridity and an increased frequency of devastating extreme precipitation events. The heirs of the Nabateans reverted to their original Bedouin subsistence strategies but continue to opportunistically cultivate terrace remains.