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Flood disturbance and regrowth of vegetation in ephemeral channels: conditions and interactions

J. Hooke
University of Liverpool, Geography, Liverpool, United Kingdom (janet.hooke@liv.ac.uk, 44 15179 42866)

Flood flows disturb vegetation growing in ephemeral channels but more information is needed on the thresholds for damage and removal and on the regrowth processes and timescales after floods. Once vegetation is re-established then it has feedback effects on processes and may raise thresholds. Several sites in SE Spain have been monitored for the effects of flows and for the growth and responses of plants over a period of >15 years. Two major floods and many minor flows have occurred. Measurements on quadrats and in different zones of the valley floor have allowed quantification of the thresholds for damage of different species of plant. Position of the plants in the channel also has a marked influence on effect of flows; velocities and flow forces for different parts have been calculated. The threshold for removal or mortality of certain plants in these Mediterranean valleys is very high.
Types and species of plants regrowing in different zones have been identified and rates of growth measured. The relationship to climatic and weather conditions between channel flows is analysed. Growth rates between floods are closely related to moisture availability, mainly influenced by inter–annual variability of rainfall but also varying with location in the channel. One site in which hydrological regime was altered by human actions has shown marked change in vegetation cover and in channel response. Feedback effects reduce erosion and increase sedimentation and these effects have been measured directly and by calculation of roughness and resistance effects. The results demonstrate the different degrees of adaptation of plants to disturbance, natural vegetation such as phreatophytes showing high resilience but crop trees such as olives and almonds on floodplains being vulnerable to high flows.