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Limited hydrological connectivity in arid and semi-arid areas

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Many studies contend that runoff and erosion rate increase as slope angle and slope length increase. These studies have been often conducted in agricultural areas, on small plots with quite uniform surface conditions;and relatively low slope angles. Such an approach assumes flow continuity and sediment movement along whole hillslopes; or in other terms That runoff concentration time is shorter than the duration of most effective rain events.
Question: Can we apply the above approach to dry-land areas where the concentration time, especially over long hillslopes is much longer than the duration of most effective rainshowers. Hydrological data collected at two small instrumented watersheds, located one in an arid rocky area and the other in a semi-arid area (90 and 280 mm average annual rainfall)point to a high frequency of flow discontinuity at the hillslope scale, as well as along channels of first order streams,even at extreme rain events. Connectivity at both scales is higher in the arid than in the semi-arid area. Flow discontinuity increases with increasing slope length. The frequent flow discontinuity at the hillslope scale leads to the development of colluvial deposits at the slope base; characterized by high infiltration rate, that limits flow connectivity at the hillslope-channel interface. THe frequent flow discontinuity in dry land areas is mainly explained by the intermittent character of most rain events. The duration of most effective rainshowers is much shorter than the concentration time require for a continuous flow from the top to the base of the flow. The long term effect of flow discontinuity is very well expressed by soil development along the colluvial mantle; whose upper part if far better leached than its lower oart