



Ephemeral channels in the steppe region of Mongolia – geomorphometric analysis and hydrological implications

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Studies on dryland channels and their geomorphological and hydrological implications mostly concentrated on warm regions while (semi-)arid temperate and cold regions have been widely neglected. In the context of a paleoclimatological and geomorphological study carried out in the Ugi Nuur basin (47°44'N, 102°46'E), Mongolia, ephemeral channels in this highly continental, semi-arid steppe region were investigated. Channel and terrain characteristics of small catchments ranging from 0.02 to 2 km² were recorded by Differential GPS (DGPS) surveys of channel length profiles and cross profiles. Information on discharge amounts along channel courses during extreme rainfall events were derived from measuring hydraulic radii and pebble clusters. Results show that in the study area channel networks are only initially developed. Concentrated surface run-off and, thus, channel incision, occurs predominantly in first-order valleys that are small and steep. These channels are poorly connected and characterized by a frequent spatial change of depositional features and erosional forms. Channel length-discharge relationships show that discharge amounts rapidly decrease as soon as the increase in drainage area declines. These findings suggest that flood wave propagation is largely infiltration driven. Geomorphologically the spatial variability of discharge causes debris and pebble sorting according to grain size. It remains, however, unclear whether the development of the current fluvial landscape forms in the steppe region of Mongolia can be attributed to climatic phases during the Holocene or whether they represent a dynamic equilibrium between concentrative and diffusive processes of landscape evolution.