



Reconstructing flood magnitude and frequency in an ungauged, ephemeral river: The Buffels River case study (Namaqualand, South Africa)

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In many arid regions such as Namaqualand (NW South Africa) effective management of water resources can be hindered by poor hydrological records. The Buffels River, the largest ephemeral river in Namaqualand (9000 km²), is ungauged, therefore, there is no available data on river flow and global change in the catchment. The aim of this paper is to present: a) reconstructions of flood discharges based on hydraulic modelling of narrow bedrock reaches, where slackwater flood deposits were used as indicators of minimum floodwater elevation; b) an analysis of the frequency of flood events in the basin over the last century, based on questionnaires circulated to village elders; and c) the palaeohydrology of the river to identify long-term changes in fluvial activity and flood discharge. The results indicate that flows during the last ca. one hundred years have been relatively low compared to periods of increased fluvial activity in the past. The chronology obtained from fluvial deposits in the basin has identified one major phase of increased flood magnitude during the 14th and 15th centuries A.D. and a probable later phase during the 18-19th centuries. This implies that river flow in the Buffels River is sensitive to climate change and provides evidence for the impact of the Little Ice Age on the hydrology of the region.