



The alluvial record of Quaternary flow-regime change along a large river in central Australia.

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As a low gradient arid region spanning the tropics to the temperate zone, the now largely arid Lake Eyre basin has undergone gentle Neogene crustal warping leading to substantial alluvial deposition in a series of shallow basins providing repositories of evidence for palaeoclimatic and palaeohydrological changes from the late Tertiary to the Holocene. More than 80 luminescence dates along the lower 500 km of Cooper Creek have established a chronology of multiple episodes of enhanced flow from about 750 ka to the Holocene. The early to mid Quaternary was at times exceptionally wet, however, since oxygen isotope stage (OIS) 7 or 6 to the present there has been a general decline in the wet phases to which the eastern part of central Australia has periodically returned. Bankfull discharges during OIS 7/6 are estimated to have been a remarkable 5 to 7 times larger than present and to have reworked the entire valley fills. During the last full glacial cycle, activity was less. Episodes of greatest runoff were not during the interglacial maximum 5e (132-122 ka) but later (~120-90ka) when sea levels and global temperatures were substantially lower. Flows peaked again in OIS 4 and 3, but not to the extent of those in OIS 5 and earlier. Activity over the past 120 ka in the Lake Eyre basin coincides broadly with that for rivers of southeastern Australia and suggests a source of moisture not just from the northern monsoon but from the western Pacific and supplied to much of the east coast.