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Late Quaternary fluvial terrace development and changing landscape connectivity in the Great Karoo, South Africa.

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Dendritic channel networks in the Wilgerbosch River catchment draining the south side of the Sneeuberg, South Africa are deeply incised exposing terrace fills of varying thickness and extent. Channel long sections exhibit 'stepped' profiles where resistant rock strata cross valley floors, but are now partially or completely breached. Using a combination of aerial image analyses, geomorphological mapping, sedimentological investigations (field logging, grain size and mineral magnetic analysis) and geochronology (OSL, radiocarbon), this presentation demonstrates the patterns and controls on erosion and sedimentation and to a lesser extent, the age structure of fills in two low-order tributaries (Africanders Kloof and Wilgerbosch Kloof) and several reaches of the higher-order Wilgerbosch River. A conceptual model of terrace development in relation to changing conditions of connectivity was tested.

Valley headwaters are dominated by discontinuous palaeochannel and floodout sediments, whilst in 2nd-4th order tributaries, five sedimentologically and stratigraphically distinct terrace fills that exceed the scale and complexity of deposits to the north of the Sneeuberg, were identified and analysed. The early part of this regional terrace succession highlights the importance of interactions between periglacial and fluvial activity on cut, fill and pedogenesis in the deglacial period. Terrace development is shown to have been a complex response to re-connection of the channel network with upland colluvial stores resulting in the valleys becoming choked with sediment. This caused a rise in groundwater and formation of extensive calcretised rootmats on valley floors and slopes acting to 'blanket' terraces 1 and 2. The thickness and longevity of this blanket is shown to restrict depth of incision in subsequent phases (T3, T4). As a result, the stratigraphic record is spatially and temporally biased toward the late Pleistocene and Holocene terraces (1, 2 and 4 respectively). The deposits in these headwater valleys have, until now, been overlooked as a source of palaeoenvironmental information. This study is the first to demonstrate the role and importance of changing connectivity in "cut and fill" phases which predate the 18th century European incursion in the Sneeuberg.