

LITHOLOGICAL CONTROLS ON WETLAND DEVELOPMENT: AN EXAMPLE OF THE KLIP RIVER, EASTERN FREE STATE, SOUTH AFRICA.

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Wetlands are a common feature of the interior highveld of South Africa, but have been little studied from a geological perspective. Ongoing research on the Klip River, eastern Free State, indicates strong lithological controls on wetland locations, and contributes to a better understanding of their dynamism. Along the Klip River, pronounced and abrupt changes in valley width are strongly linked to lithological variations. Where weakly-cemented sandstone outcrops, the river has laterally eroded bedrock and carved valleys up to 1.5 kilometres wide. This enables the river to meander within extensive floodplains marked by numerous abandoned channels and oxbow lakes, many of which host substantial wetlands. These wetlands are sustained by summer floods, but flow regimes are increasingly affected by the installation of control structures such as weirs. In contrast, where highly-resistant dolerite outcrops, lateral erosion of bedrock is restricted, with the river instead tending to erode vertically along joints. Here, valleys are narrower, rivers follow essentially straight courses for considerable distances, and floodplains are limited. In the sandstone valleys, vertical erosion rates are controlled by erosion of the more resistant dolerites downstream, and thus, in the short- to medium-term, lateral erosion dominates. The resultant meanders are naturally dynamic, with processes such as point bar deposition, cutoff formation and channel avulsion resulting in an assemblage of floodplain landforms. However, in the longer term, vertical erosion will occur in the sandstone valleys as the downstream dolerites are lowered by erosion, possibly resulting in abandonment of the floodplains and wetlands.