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TREE-GROWTH RINGS AS A PALAEOCLIMATE PROXY FOR THE KAROO BASIN

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ABSTRACT

The almost complete stratigraphic and fossil records of the Karoo Basin have made it one of the main focal points for Gondwanan palaeoenvironmental studies. The majority of Karoo palaeoenvironmental studies use vertebrate, invertebrate, macroflora and microflora fossils as proxies. Very few studies have been done on the Karoo fossil woods and their significance as palaeoenvironmental, and more specifically palaeoclimate, proxies. In this preliminary study, thirty-one *Agathoxylon* wood samples from the Ecca-Beaufort contact and five of the Beaufort Group's (Karoo Basin) formations have been analysed to reconstruct the palaeoclimate for the Karoo Basin during the Beaufort times. The growth rings of each sample underwent a detailed growth ring analysis where six palaeoclimate significant anatomical features were chosen and used to obtain palaeoclimate information. The growth rings are generally wide and reflect a seasonal climate with warm/moderate temperatures and sufficient rainfall. The presence of false rings in some of the growth rings suggests that some years experienced water-stressed/semi-arid conditions. The intra-ring variation and CSDM curves of the growth rings indicate that the fossil wood samples generally reflect 'complacent' trees with deciduous habits. The majority of growth rings contain shear zones (i.e. S-type growth rings), which indicate a seasonal climate but can also be seen as indicators of zones with weakened wood cells (due to disease or post-depositional compression). Although this study only represents a small sample size (thirty-one specimens with very few growth rings each), the growth ring analysis illustrates the palaeoclimate potential of the Karoo fossil woods and how they could aid in improving Karoo Basin palaeoenvironmental interpretations. However, a wider geographic range and more fossil woods from other stratigraphic positions/time periods are required for the basin-wide palaeoclimate reconstruction that would make these improved palaeoenvironmental interpretations possible.

Key words: *Agathoxylon* wood, Beaufort Group, palaeoclimate, complacent, deciduous