## Quantitative Evidence of a Rift Origin for the Katangan Basin from Subsidence Analysis in the Zambian Copperbelt

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We present a quantified analysis of the basin-forming mechanism of the Katangan copper basin of Central Africa. A series of local "type logs" was constructed through detailed analysis of deep cores, which have been interpreted and form the basis of a model for basin extension.

Over 10 km of diamond drill core was logged from eight drill holes across the basin. A facies scheme was established to generate palaeobathymetric estimates. Local type logs were generated and decompacted. 1D backstripping was then performed assuming Airy isostasy. The McKenzie uniform stretching model was used to estimate stretching (β) factors that best fit the tectonic subsidence profiles generated from backstripping.

A clear trend is observed of tectonic subsidence increasing from the basin margin to the west and southwest, with indications of two distinctive early rift phases in the Tonian. The deepest parts of the basin experienced >50% crustal stretching, likely accommodating a syn-rift section in excess of 2 km and a full stratigraphic succession in excess of 8 km in thickness prior to basin inversion. The tectonic subsidence profiles of the backstripped cores and their good agreement with a uniform extension model are clear evidence of a rift origin for the Katangan Basin in Zambia. β-factors of 1.1 to 1.5 match those of known rift systems.

A rift origin was previously inferred based on regional geochemistry and lithostratigraphy. Our results support this, with evidence of lithospheric-scale stretching increasing from the east to a maximum along a deep Central Rift to the south of the Domes region. Basin inversion and high-grade metamorphism represent a data boundary to subsidence analysis. Establishing this quantified tectonic framework for basin subsidence has implications for stratigraphic architecture, early basin heat flow, development of hydrothermal systems, and ultimately control of the early mineral systems of the basin.