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## Evaluation of Seismic Reflection in the Kalahari Karoo Basin, Botswana

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The Kalahari Karoo Basin (KKB) is part of the greater Kalahari Basin that covers most of Botswana<sup>1</sup>. It has been shown that it hosts significant coal as well as coal-bed methane gas potential<sup>2</sup>. The KKB has a thick cover of recent Kalahari Group sediments made of mostly unconsolidated and semi-consolidated sand with gravel, calcrete and silcrete localized interbeds<sup>3</sup>. Due to this Kalahari sediments cover, there are less outcrops and thus detailed sedimentation and stacking patterns remains unknown<sup>4</sup>.

Seismic reflection survey has the potential to help in the coal seam recognition as well as general stratigraphic documentation because Coal is a good reflector of seismic wave due to its relatively low seismic impedance. Exploration in the Kalahari Karoo basin has not been based much on seismic reflection method because it has been considered that seismic wave is highly attenuated and absorbed by the thick Kalahari sands. However the effect of the Kalahari Group has not been fully documented and examined with seismic modeling approach<sup>5</sup>. This study shows using different scenarios to examine the effect of Kalahari thickness, inter-bedding in the KKB as well as inclusion of basaltic cover.

The well logs from the central part of the KKB, the Haskell matrix method and viscoelastic finite-difference models were used in this study<sup>6</sup>. Results show that a dynamite seismic source increases chances of seeing through the thick Kalahari sequence into underlying Ecca Group which hosts the coal seams. The result also shows that inter-bedding at near surface introduces reverberation events which made it hard to identify coals seam events. The coal seam events can be seen at long offsets, through finite-difference method shot records.

### *References:*

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