

## **Occurrence of Coal Seam Methane in South African Coal Seams and Igneous Intrusions in Karoo Basin**

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South African coals have not yet been extensively studied for coal seam methane resources. The main reason is that most of the 240 Mt of coal produced annually is sourced from surface and shallow underground coal mines where mining takes place at shallow depths of ~80m to ~120 m. At these depths, coal mining is considered relatively free of gas hazards. Therefore, gas content or other gas related properties of coal seams are not measured on a regular basis. Gas content measurements undertaken at some mines of Highveld coalfield indicates methane content of up to 1.3 m<sup>3</sup>/t for coal seams at 110 m depth. This level of gas content cannot explain the occurrence of gas outburst events in coal mines such as those that occurred in Twistdraai Mine in the Highveld coalfield.

Occurrences of gas outbursts suggest that high gas content in adsorbed and free phase might be present in some sections of the coal seams. Coal seams might be quite friable in those sections, allowing pulverisation during outburst. The survey of gas outburst events indicates that the locations of high gas emissions were mainly in the vicinity of igneous intrusions, namely dolerite intrusions. This study, which is the first of its kind, was undertaken to investigate potential locations for the occurrence of coal seam methane in South African coal seams in respect to the igneous intrusions and their enhancement effect on methane release and gas storage of these coals. In addition, CO<sub>2</sub> storage properties of coals were measured and the role of dolerite intrusions, as enclosures and gas traps, are being investigated, as a preliminary evaluation of CO<sub>2</sub> sequestration of some South African coals.