Early stage diamond exploration commences with the careful selection of geophysical anomalies that are characteristic of kimberlites. However, it is also essential to map the structural controls on kimberlites and the background geology. When used in conjunction with the expected age of emplacement an understanding of the geology helps determine the degree of kimberlite preservation. This may impact on the economics of a discovery but also provides boundaries on the physical property contrast between the target body and host rock.

Historical mapping of the geology of the area around Jwaneng Diamond Mine in Botswana was accomplished utilizing a combination of magnetic data and drilling as the region is covered by Kalahari sediments with thicknesses of up to 60m. A high-resolution airborne gravity gradiometer survey was flown during 2006 utilising the Bell Geospace Air-FTG™ instrument mounted in an airship platform adding important information to the mapping of the complex geology of this area.

A major intrusive with a diameter of 25 km dominates the gravity and magnetic response of the area with a dense and highly magnetic inner core. The southern edge of this body is truncated by a trans-continental structure that has been correlated with the Thabazimbi-Murchison Lineament.