Earth Science Research at any Scale

University of Western Michigan

For University of Western Michigan professor, Estella Atekwana, geophysical research is a challenge to address at any scale — from near surface (0 to 100m) to crustal depths. Working from her home base at the Non-Invasive Site Characterization Lab in Kalamazoo, Michigan, Estella is pushing the scientific envelope in both environmental and crustal-scale tectonic fields.

At one end of the spectrum, her work focuses on environmental characterization studies to determine the effects of LNAPL biodegradation on geophysical signatures. And at the other end, she travels far afield to study incipient rifting in the heart of the African continent.

Naturally, data types also vary considerably — from ground EM31, 34, and magnetics for nearsurface work to high-resolution airborne magnetics for crustal work.

The common element is the use of Geosoft as a single tool for interpreting data. For environmental characterization, the focus is on mapping contamination and identifying buried pipes for better data control. For crustal work, she says "tools such as MAGMAP and Euler Deconvolution are extremely valuable in providing insights into the initial stages of continental fragmentation."

To give a better look into some of the exciting results to date, we include images and an interpretation from the Okavango Rift basin in northwestern Botswana.

As Estella notes, "the data suggest a down dropped block to the west of the Kunyere fault with an estimated throw of 300m, confirming the nascent character of the rift. Thus the Okavango Rift basin, represents one of the youngest continental rift basins on earth today."

In addition to research, University of Western Michigan students are also using Geosoft in the Geoscience degree programme at undergraduate and graduate levels. Students in the "very successful" environmental geophysics course perform end-to-end acquisition, processing, integration, and report preparation using sample data from specific project areas.

A unique aspect of the Western Michigan programme is its hands-on orientation. The practical application of geophysics is very important because, as Estella notes, "There are no textbooks in the real world ... either they know the science or they don't."

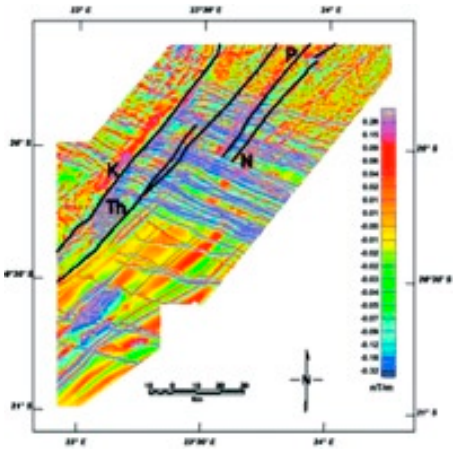

Figure 1: Vertical derivative map of the maun zone.

Figure 2:
Euler deconvolution solutions. K,T,P,N, are the kunyere, Thamalakane, phuti and nare faults. The euler map shows depths to The top of the dykes.

Figure 3:
geologic map of the east african rift system.

Geosoft Software & Solutions featured in this story.

- Oasis montaj
- MAGMAP Filtering extension
- Geophysics extension