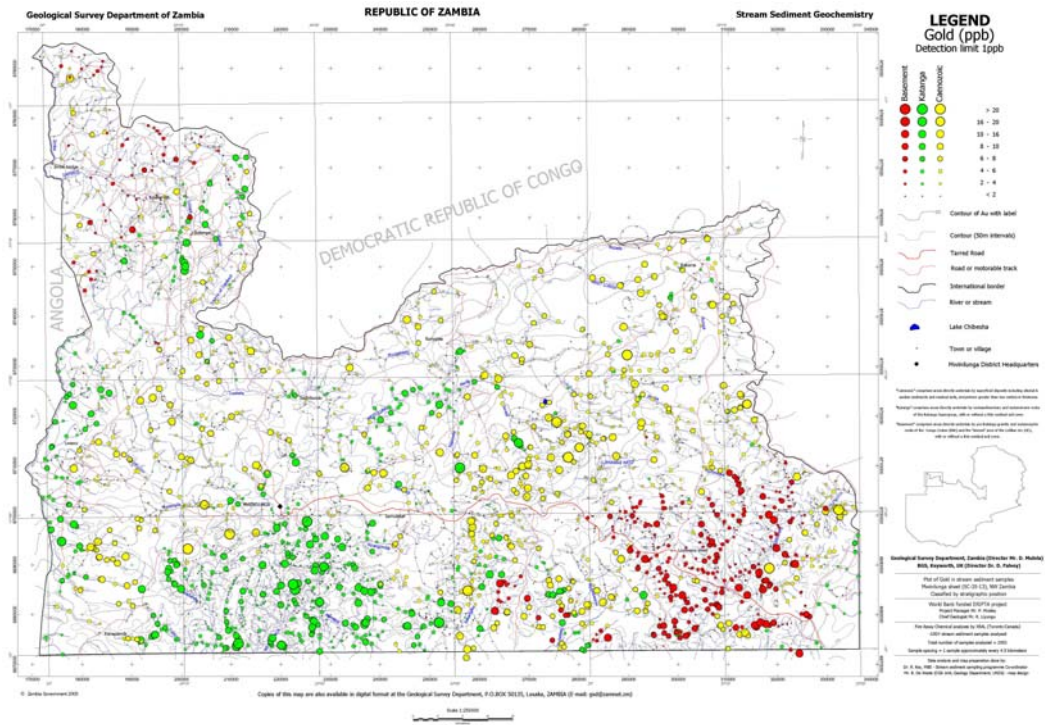


# Stream and Soil geochemistry in Northwest Zambia

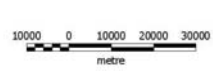
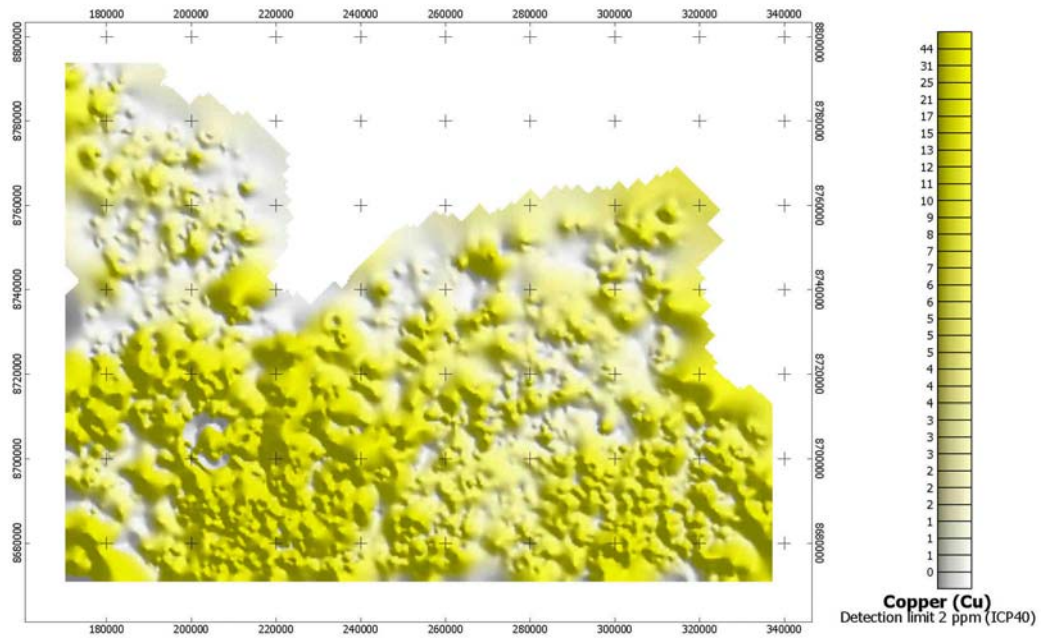
Bert De Waele and Roger Key

Case Study

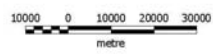
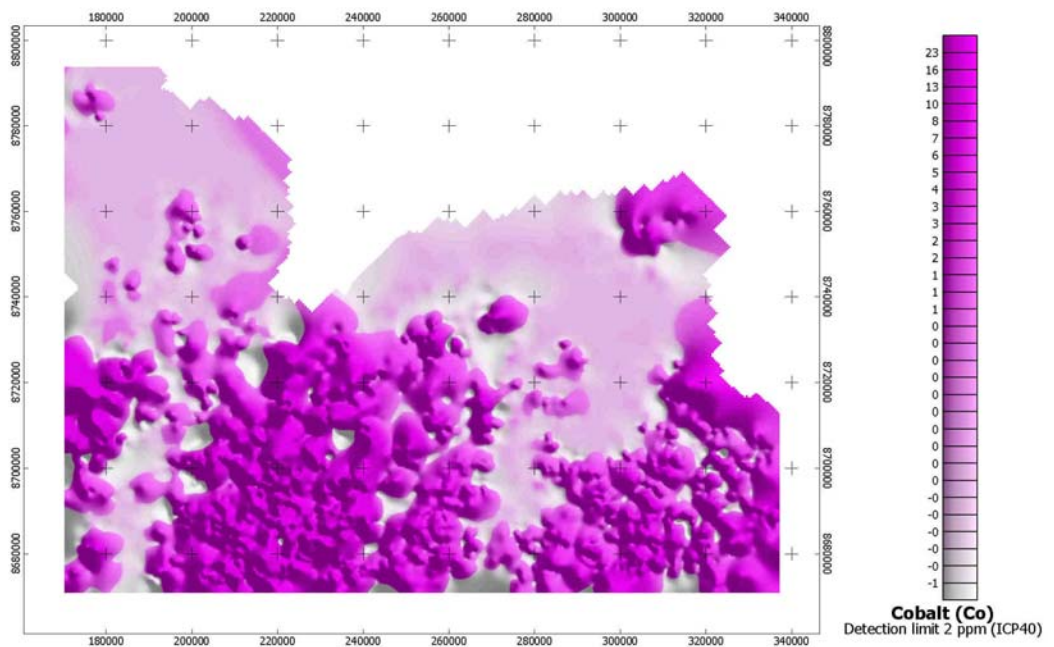
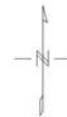
The Geological Survey of Zambia, in conjunction with the British Geological Survey, carried out detailed soil and stream sediment geochemistry between 1998 and 2000. The data were processed at the Computo-Geological Advisory Unit of the University of Zambia. Based on the extensive data set, a series of statistical tools are used to model trace and major element distributions in northwest Zambia, link this data in with the known geology and mineral potential and to establish a baseline environmental dataset for future monitoring of environmental impact of mining and mineral processing activities.



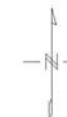
Colour coded proportional size plot of gold assays (2953 samples). This plot is produced using Fire Assay gold (ppb) with red for basement, green for Katanga and Yellow for Caenozoic cover. The plot shows evenly distributed patterns for gold. Highest gold assay is 87 ppb, indicating there's no significant gold mineralisation in the area. There is a good correlation between Au, Pt and Pd (as expected). This is important, as 150-200 km to the east, the Kansanshi deposit has Cu-Co-Au.



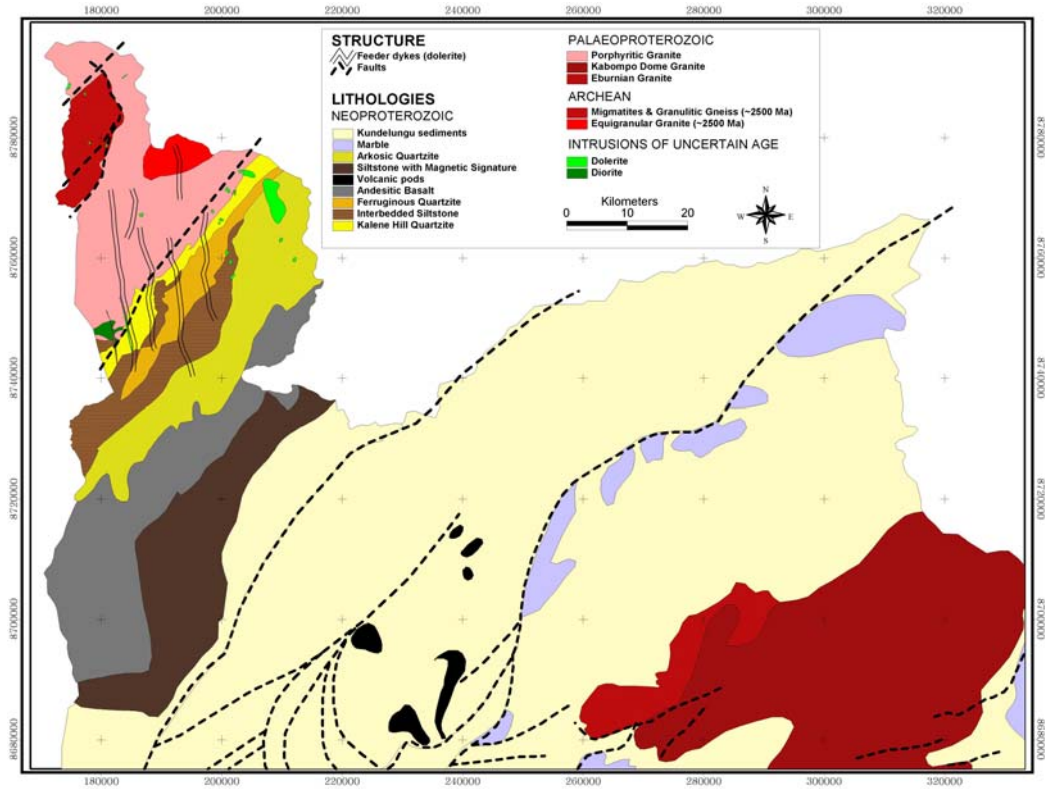
**Geochemical plots for Northwestern Province**  
Commodity : COPPER



**Geochemical plots for Northwestern Province**  
Commodity : Cobalt



Copper and cobalt show a clear association between Cu-Co and Katangan cover as well as basement below the Copperbelt. The basement (red dots in gold.jpg) in the northwestern corner of Zambia belongs to the Congo craton (2.5 Ga), while the basement in the south forms part of the 1.88-1.86 Ga Domes Region of the Copperbelt (a younger magmatic arc). Cu and Co appear to be strongly related to possible primary mineralisation in these Domes granitoids, as well as secondary mineralisation within the Katanga succession.



The geological map is produced using Arcview 3.2a and shows the geology, which relates well to the stream sediment geochemistry.

### Technical Notes

The Computo-Geological Advisory Unit's data processing capabilities include Geosoft *Oasis montaj* with the *montaj Geochemistry* and *montaj Geophysics* extensions. Geosoft provides the ability to process and analyse Geochemical and Geophysical datasets, and is directly compatible with Arcview and ER Mapper.

The *montaj™ Geochemistry* extension is designed for the exploration geologist. This extension enables geoscientists to effectively import, validate and analyze their surface geochemical data. The *montaj Geophysics* software extension provides a range of filters and statistical tools for working with large-volume geophysical data.

### **Acknowledgements**

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- Messrs N Franey and H Carruthers of Anglo American and Cyprus Amax respectively are thanked for provided unpublished and confidential geological and geophysical data from their companies' base and precious metal exploration work in the Mwinilunga Sheet.
- Dr Eugene O'Connor of the British Geological Survey produced the enhanced satellite imagery that was invaluable in mapping the superficial deposits.
- Mr. Richard Carruthers also of the British Geological Survey integrated all the available geophysical data to produce interpretation maps of bedrock geology.
- Ms Jane Robertson, Mrs. Ruth Addinall and Dr Robert Cuss of the British Geological Survey undertook the digital plotting of the final 1:250 000 maps.

### **About the Author:**

At the time, Dr. De Waele was a member of staff of the Geology Department of the University of Zambia, and the Belgian funded Computo-Geological Advisory Unit (University of Ghent). He now is a post-doctoral fellow at the Tectonics Special Research Centre at the University of Western Australia (Perth) Dr Key publishes with the permission of the Executive Director of the British Geological Survey (NERC). The maps are produced and copyrighted to the Geological Survey of Zambia.