

## **Finding new sources of copper in Zambia**

The Zambian Copperbelt is the largest known source of copper on Earth. Research at the University of Southampton has challenged conventional thinking about mineral exploration in the country through a new scientific understanding of the processes responsible for ore formation. Professor Steve Roberts' findings have transformed the prospects for mining in the country, providing new opportunities for mineral exploration within the Zambian Basin and other sedimentary basins around the world. His team is supporting leading commercial companies in the area.

There is great demand for copper throughout the world, particularly to supply fast-growing economies in countries such as China. The de-nationalisation of Zambia Consolidated Copper Mines (ZCCM) in 1999 gave Professor Roberts and his colleagues new opportunities to investigate the geology of the area, backed by grants from UK research councils and industry. They started by examining the Nchanga mine, which first began production in 1939. The team embarked on a combination of structural mapping and geochemical techniques, which included major and trace element and stable and radiogenic isotope analyses with the aid of the world class geochemical analytical facilities at the National Oceanography Centre Southampton.

A better understanding of these processes has helped commercial geologists in their search for new areas of exploration. Southampton's researchers, including several PhD students, are active in the field with major mining companies to test their theories. Their research findings have encouraged major operators including Anglo American, Equinox/Barrick, First Quantum, Vale and Rio Tinto to consider the possibility that viable deposits exist outside the regions already exploited using the traditional geological techniques. In addition, mining companies have been provided with the geochemical tools and modelling software to find new reserves.

Rio Tinto Chief Geoscientist Adam Duffin and Exploration Consultant Richard Sillitoe have noted that "The University of Southampton group led by Steve Roberts has played a key role in an ongoing reinterpretation of the geology of the Zambian Copperbelt. This fresh vision is stimulating exploration activity in the region, impacting on the strategies that companies are employing and leading to increased expenditure."

Two new world-class discoveries have been made in the sedimentary basin in the last five years. Former PhD student Ross McGowan, now CEO at Armada Exploration, was actively involved in the recent discovery of Kamoanga Deposit in the Democratic Republic of Congo, which now ranks as the world's largest undeveloped high-grade copper discovery, with 739 million tonnes grading 2.67 per cent copper. Exploration work is also underway to find similar deposits in basins formed in similar environments in places such as Gabon.