Regolith Research Underpins Discovery of Zircon-rich HMS in the Eucla Basin

The discovery of significant zircon-rich, heavy mineral sands (HMS) announced by Iluka Resources Limited on 5 November 2004 at their Jacinth Prospect was predicted by LEME researcher Dr Baohong Hou of Primary Industries and Resources, South Australia (PIRSA). Hou's analysis followed detailed stratigraphic studies of ancient shoreline facies in the Maralinga Embayment of the Eucla Basin in South Australia. The work is the culmination of fruitful collaboration over several years with Professor Larry Frakes (Adelaide University) and Dr Neville Alley (PIRSA) on the stratigraphy and sedimentology of transported regolith on the central Gawler Craton. As principal researcher, Hou developed new models of landscape evolution and revised interpretation of the dynamics of sediment accumulation in palaeo-rivers and associated shoreline deposits on the craton.

Previous mineral exploration in the region in the middle 1980s and early 1990s had produced isolated intersections of significant concentrations of HMS. However, little was understood about the stratigraphic context of these HMS occurrences in what is a massive barrier dune complex, expressed as the Ooldea Range, which extends for more than 550km, is up to 25km wide and over 100m high. By re-examination of samples from previous drilling, held in PIRSA's Glenside Core Storage Facility, and utilising data from offshore marine sediments, Hou was able to unravel the complex stratigraphy of the barrier dunes and distinguish several cycles of marine transgression. In a landmark paper in 2003 in the Australian Journal of Earth Sciences, Hou together with co-workers, summarised the stratigraphic analysis and described models for the accumulation of HMS that pointed to preferred sites. They concluded that the area had potential to be a world-class HMS province.

Iluka Resources, a global leader in zircon and titanium production, were well aware of the potential of ancient shorelines along the southern margin of Australia to host significant HMS deposits. In 2001, Iluka applied for EL 2900, which includes the new Jacinth discovery, based on their in-house assessment of the high prospectivity of the region. The company has maintained an ongoing interest in Hou's work and were quick realise the exploration implication of the proposed new geological models. During 2003, Iluka applied for additional exploration rights over substantial tracts of the Ooldea and Barton Ranges. Drilling of strandlines commenced in early 2004 and the Jacinth Prospect is an early exploration success that will drive an expanded programme of exploration drilling and sample testing during 2005. Local SA junior explorer, Adelaide Resources Limited is also set to benefit, with increased activity on their adjoining Exploration Licence 2840, in joint venture with Iluka.

Dr Hou presented an overview of his work on heavy mineral deposition in the eastern Eucla Basin at the recent LEME Symposium in Perth and an extended abstract is published in the proceedings volume *Regolith 2004*.

References

Hou, B., Frakes, L.A., Alley, N.F. and P. P. Heithersay, 2003. Development and placer potential of the eastern Eucla Basin, South Australia. *Australian Journal of Earth Sciences,* **50**: 955-965.

Hou, B and Frakes, L.A., 2004. Tertiary sea levels and heavy mineral deposition in the eastern Eucla Basin, SA. *In:* Roach, I.C. ed. *Regolith 2004*. CRC LEME: 140-143.