MEDIA RELEASE

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ATTENTION: Chiefs of Staff, News Directors

Ore-some discovery about Earth's middle age

A new study reveals that the ancient deep ocean was not only devoid of oxygen but also rich in iron - a key biological nutrient - for nearly a billion years longer than previously thought.

The study was undertaken by a team of scientists from UTAS, University of California at Riverside (UC-R), the Chinese University of Geosciences and the University of Manitoba.

Their results show the oceans were rich in iron right through to a key evolutionary interval that culminated in the first rise of animals, and through the time that Australia's Broken Hill and Mount Isa ore deposits were formed.

Results are published in the on-line edition of the journal *Nature* (www.nature.com/nature/index.html).

Professor Tim Lyons, professor of Geobiology from UC-R said "the implications of our work suggest a need to rethink all the models for how life-essential nutrients were distributed in ocean through time and space."

Dr Peter McGoldrick from ARC Centre of Excellence in Ore Deposits (CODES) at UTAS said "there are other implications for how giant zinc and lead ore deposits formed during Earth's 'middle age', and where they might be found in sedimentary basins from this time."

Over the last half a billion years, the ocean has mostly been full of oxygen and teeming with animal life. But prior to that, for the first four billion years of Earth's history, oxygen was harder to come by.

Most scientists agree that the early planet Earth (before 2.4 billion years ago) contained only trace quantities of oxygen and that the oceans were mostly full of dissolved iron.

But there is far less agreement among scientists about the chemical composition of the deep ocean during the middle chapters of Earth's history. Ideas range from an oxygen-rich ocean, much like the modern one, to an inhospitable realm rich in toxic hydrogen sulfide.

"This gap in knowledge came from the lack of physical evidence to gauge the amounts of oxygen, iron and sulfide in the ancient oceans at a critical time in

Earth's middle age - roughly 1.8 and 0.8 billion years ago," said Noah Planavsky, doctoral student from UC-R.

"We knew from investigations into sedimentary zinc deposits undertaken a decade ago that Australian rocks of this age were unusually rich in iron" said Dr McGoldrick.

By re-examining the rock samples from Australia, and using additional ones from the USA and China the research team have been able to address this data deficiency.

Their results point towards a remarkable persistence of oxygen-poor, iron-rich conditions in the oceans for 90 per cent of Earth's history. Oxygen and hydrogen sulfide, when present, were limited to the surface layers and along the margins of the oceans, respectively.

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