New evidence found for the oldest oxygen-breathing life on land

October 19 2011

New University of Alberta research shows the first evidence that oxygen-breathing bacteria occupied and thrived on land 100 million years earlier than previously thought.

The researchers show the most primitive form of aerobic respiring life on land came into existence 2.48 billion years ago.

The research team, led by U of A geomicrobiologist Kurt Konhauser made their find by investigating a link between atmospheric oxygen levels and rising concentrations of chromium in the rock of ancient sea beds. The researchers suggest that the jump in chromium levels was triggered by the land-based oxidization of the mineral pyrite.

Pyrite oxidation is driven by bacteria and oxygen. Aerobic bacteria broke down the pyrite, which released acid at an unprecedented scale. The acid then dissolved rocks and soils into a cocktail of metals, including chromium, which was transferred to the ocean by the runoff of rain water.

Konhauser says the key to the process is oxygen in Earth's atmosphere that allowed bacterial oxidation of pyrite. The researchers dated the peak for chromium levels in marine sedimentary rock was reached 2.48 billion years ago.

"This gives us a new date for the Great Oxidation Event, the time when the atmosphere first had oxygen," said Konhauser. "The rising levels of

atmospheric oxygen fostered the evolution of new bacteria species that survived by aerobic respiration on land.

"Our ancestors started off in an acid bath as oxygen-breathing bacteria."

The same bacterial life forms are alive and well today, living off pyrite and settling in the highly acidic waste waters of mining sites the world over.

The research by Konhauser and his team is published in the October 20 edition of the journal *Nature*.

Provided by University of Alberta

Citation: New evidence found for the oldest oxygen-breathing life on land (2011, October 19) retrieved 26 April 2024 from https://phys.org/news/2011-10-evidence-oldest-oxygen-breathing-life.html