An evolving understanding of extinction

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Few things related to science capture the imagination more than the magic of worlds past. This includes the origins of life, dinosaurs, mass extinctions, meteorite impacts, and the evolution of our species. Understanding the evolution of life is central to the way we view ourselves and others and developing this field is thus critical.

Furthermore, South Africa's rich palaeontological, palaeo-anthropological and archaeological record provides a unique competitive advantage to local heritage-related scientists.

Palaeosciences is the only discipline dedicated to understanding the origin and development of past life and its interactions with changing environments. It is the responsibility of these scientists to ensure understanding of the depth of our dependence on Earth as a life support system. Additionally, paleosciences research can provide knowledge of how to manage human interactions with the planet responsibly.

As our knowledge of the Earth expands, we begin to realise far more synergy and mutualistic relationships with the biological world—built up over millions of years—in many of the fundamental processes to secure biodiversity, soils, water, minerals, energy, and other resources.

South Africa rocks

South Africa is poised to become a global leader in an area of geographic advantage.

Because of the country's immense diversity, antiquity, and continuity of geological, palaeontological, and archaeological records, and its rich genetic heritage, South Africa is unique in the world.

The country boasts some of the most significant mineral deposits on Earth and preserves, amongst others, the oldest evidence of life on Earth from over 3,500-million years; the most distant ancestors of dinosaurs from 200-million years ago; and a remarkable record of human origins and achievements over four-million years.

Erasing Earth

The study of past biodiversity has recognised that five global extinction events have occurred in the last 500-million years, where between 65 percent and 95 percent of species went extinct over a relatively short period. South Africa has a record of four of these five extinction events. Many scientists consider that the Earth has now entered a new epoch—the Anthropocene. Like other transitions between geological eras, the marker for this transition is a mass extinction event, although this one—uniquely—is human-induced. And avoidable.

The current rate of species extinction is estimated to be 10 to 1,000 times higher than the natural, background rate. This is likely to increase as habitat destruction, global change, and other human-induced stresses on the natural environment accelerate.

South Africa is the only country in the world with the necessary fossil resources to undertake a research initiative over such an extensive period. Our fossil archives provide case studies throughout Earth's history to understand how climactic and environmental change affect biodiversity.

Decoding the mechanisms that lead to population extirpation [localised

extinction] and ultimately species extinction under climate change is critical for scenario-planning, interpreting, and possibly predicting its impact on biodiversity and to inform policy to conserve South African biodiversity in future.

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