Geophysical Research Abstracts, Vol. 8, 11077, 2006
SRef-ID: 1607-7962/gra/EGU06-A-11077

The African Plate: tapping 4 billion years of geodynamics and Earth system evolution.

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Recently the German-South African project Inkaba yeAfrica has set out a new chapter in European-African collaborative interdisciplinary geosciences research towards a long- term view of the co-evolution of the African continent, surrounding oceans and biota. The project aims to tease out the memory of Earth's life-support systems and climate past, something that is better recorded in Africa than on any other continent. The African Plate and the African Continent make up about a fifth of the total surface of the Earth and its continents, respectively. Africa thus stores a significant volume of scientific information needed to better understand how the Earth works, how it has evolved, and how it might fare in the future. The oceanic portion of the plate records 180 million years of continuous oceanic lithosphere formation, whilst the continent's oldest rocks recorded to-date, in central Africa, may be more than 4.0 billion years old. Africa has at least 8 large Archean cratons with well preserved sequences and lithosphere sections going back to 3.5 Ga, the anatomy of which provide profound insights into key concepts of geologic and biologic co-evolution, metallogenesis, and the origin of Earth's first continents. Crustal evolution is represented throughout the 3.5 billion years by vast areas of both juvenile and reworked crust (and sediment cover) that allow detailed curves of crustal growth, geochemical changes, and impact rates to be tested. The African plate is unique in a global perspective in several ways: first the African plate is nearly stationary, and in an embryonic state of dividing into two new plates. Second, whereas the bimodal topography of most continents can be related to processes across compressional plate tectonic margins, this is not so for Africa. Africa is surrounded by more than 90% by extensional plate margins, and the state of stress across its upper continental crust is predominantly extensional. Yet, Africa is host to some of the world's greatest elevated regions and plateaux (Southern and East

African highlands), and one of the world's fastest rising/exhuming continental blocks (Rwenzori mountains). Since the onset of its formation as a modern plate, Africa has acted at any one time as a mosaic of up to five sub-linked lithospheric segments, has hosted at least four large igneous provinces and, has been episodically intruded by a vast number of kimberlitic and related intrusions. In southern Africa these magmatic episodes can be linked directly to episodes of increased on-shore erosion and off-shore sediment accumulation, making Africa the world's best laboratory to study local and continental-scale epeirogeny, landscape evolution, and their links to deep mantle dynamics. The observations of fast changing magnetic signatures across the southernmost part of Africa also provide information on core dynamics and a possible magnetic reversal 'caught in the act'. By taking a fresh lead in Africa, the German geosciences community will help establish how to best differentiate natural from anthropogenic Earth system changes and to use this knowledge to assess and economically evaluate global changes induced by humans in Africa. We hope other European nations will follow suit in this dynamic geosciences interaction with Africans.