

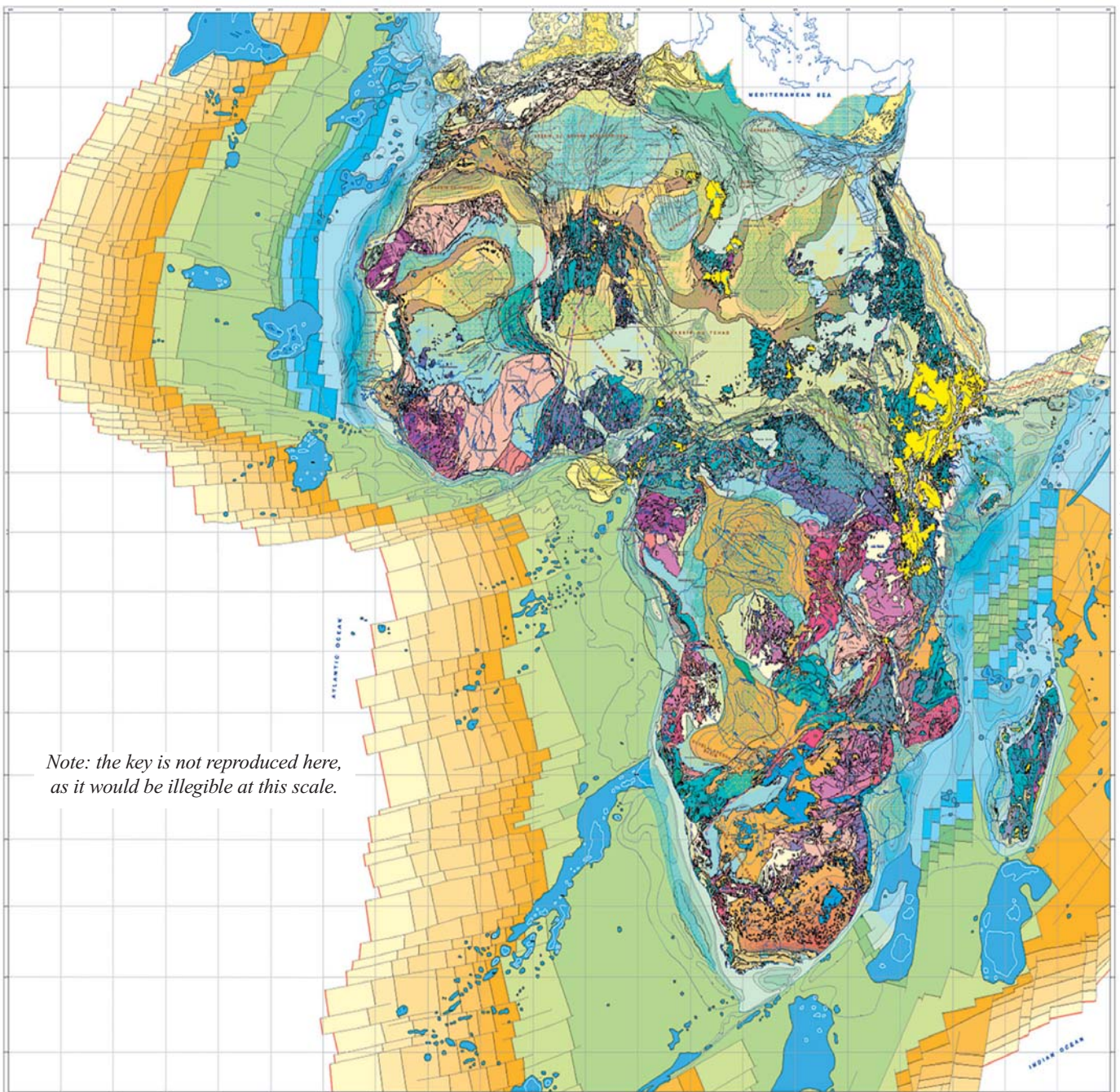
A tectonic map of Africa

Twenty-three years after this pharaonic project began, UNESCO and the Commission of the Geological Map of the World (CGMW) released the second edition of the *Tectonic Map of Africa* (below) on 8–14 January at the University of Johannesburg (South Africa), during the 23rd Colloquium of African Geology. The map was distributed to all African universities with Earth science departments and to all African geological surveys during the colloquium.

Over the past two decades, UNESCO and the CGMW have sponsored countless meetings to compile and harmonize the reams of data collected over the years by geologists from Africa and Europe, as well as by the oil industry.

This new edition takes into account the most recent developments in Earth sciences with ever-more precise and profuse radiometric dating of formations from the Archean [(4000–2500 million years ago (Ma³))] and Proterozoic (2500–542 Ma), on the one hand, and a deeper knowledge of the structure of the great African sedimentary basins thanks to oil exploration, on the other.

The map portrays the successive orogenic systems (the formation of large mountain belts): Archean, Eburnean–



Palaeoproterozoic (2500–1600 Ma), Kibarian–Mesoproterozoic (1600–1000 Ma), Panafrican–Neo-proterozoic (1000–500 Ma), Variscan–Cap Fold Belt (400–300 Ma) and the Atlas–Alpine Orogen (from 65 Ma onwards).

The map also shows the great magmatic outpourings during post-Palaeozoic times (less than 250 Ma) corresponding to the activity of hotspots: the Central Atlantic Magmatic Province (*in purple* on the map), Karoo (*sky blue*), Etendeka (*dark green*, related to the Parana traps in South America), Madagascar volcanism (*lime green*), the Ethiopian traps merged with the volcanism generated by the opening of the Great East-African rift (*yellow with overprints*), as well as other Cenozoic volcanics (*same yellow without overprints*) disseminated in Africa. Younger granites are also featured (*dark blue*).

Special attention was paid to representing the large sedimentary basins shaped from the Archean up to the Cenozoic (65 Ma to the present), with a specific colour being attributed to the date of initiation of each basin. Moreover, whenever the Cenozoic cover of an older basin is less than 1 000 m thick, this is shown by a scattering of superimposed dots.

Reflecting the importance of the African continental margins for oil and gas exploration, the map indicates the approximate limit between the continental and oceanic crusts of the Atlantic and Indian Oceans. The age of the oceanic crust is indicated by a succession of now conventional colours from blue for the oldest age through green and orange to cream for the youngest.

Geological maps are familiar tools for understanding the scientific processes of the Earth's formation and as a source of data for mineral and oil exploration. They are perhaps less known for their value as a basis for policies concerning groundwater evaluation, natural disaster mitigation, land use, soil conservation and environmental monitoring, among others. Moreover, geological hazards such as the East African Rift and the Cameroon Volcanic Line are also gifts, for they have favoured the development of biodiverse ecosystems over time and attracted human settlements in search of fertile soils for agriculture. Today, these features offer vast potential for geotourism and other socio-economic activities.

The *Tectonic Map of Africa* has been drawn to a scale of 1/10 000 000. UNESCO and CGMW are preparing a new 1/5 000 000 edition to provide more detailed information. This edition will be ready in time for the 34th International Geological Congress from 5 to 10 August 2012 in Brisbane (Australia).

UNESCO and CGMW are also currently preparing a Seismotectonic Map of Africa to serve as the basis for a realistic seismic hazard assessment. They are also planning a complete inventory of abandoned mines in sub-Saharan Africa. This map will serve as the basis for drafting practical guidelines for eliminating or reducing the associated environmental health risks.

The next challenge for geological mapping in Africa will be to ensure that all existing paper maps are conserved via digitalization. The OneGeology project launched in 2007 during the International Year of Planet Earth aims to produce

a single transnational geological map which would be accessible to all online and ultimately linked to real-time databases. To date, only 10 African countries have contributed to this project, less than 20% of Africa's potential participation.

The first edition of the *Tectonic Map of Africa* was produced before the development of the plate tectonics concept. Compiled by the CGMW, it was published in 1968 by the Association of Geological Surveys of Africa and UNESCO.

For details: (in Nairobi) sf.toteu@unesco.org; to purchase the map: cgm@club-internet.fr; www.onegeology.org

China hosting centre on ocean dynamics and climate

A Regional Training and Research Centre on Ocean Dynamics and Climate was launched on 9 June in Qingdao City at the host centre, the First Institute of Oceanography, which is part of the State Oceanic Administration of China. The centre is the first to join a network launched in 2008 by UNESCO's Intergovernmental Oceanographic Commission (IOC).

The centre will provide young scientists from developing countries in Asia in particular with training once a year on ocean dynamics, the interaction between air and sea and numerical modelling, at no cost to the beneficiary. The first regional training session on ocean models got under way just a day after the launch, winding up on 15 June.

Over the coming years, a network of training and research centres on oceanography will be established within national oceanographic institutes and universities to improve regional capacity in marine scientific research and foster more sustainable and systematic observations.

'Planet Earth really should really be called Planet Ocean,' observes Zhu Wenxi from UNESCO's Bangkok office, which piloted the project. 'The oceans account for 97% of the Earth's water. They are the lungs of our planet, providing most of the oxygen we breathe; they regulate the Earth's climate and are a major source of food and medicines.'

'The coastal and marine ecosystems of the Western Pacific are among the richest and most productive in the world,' adds Mitrasen Bhikajee, Deputy Executive Secretary of the UNESCO-IOC, who spoke at the launch. 'They are home to 76% of the world's coral species, for instance.' In an acknowledgment of the region's strategic importance, the UNESCO-IOC decided to create a Sub-Commission for the Western Pacific (WESTPAC⁴) in 1989, hosted by UNESCO's Bangkok office.

For details: www.fio.org.cn/english/training_center/index.htm; (in Bangkok): w.zhu@unesco.org; m.bhikajee@unesco.org

3. All dates are approximate.

4. Covering China, Indonesia, Japan, Malaysia, Philippines, Rep. Korea, Singapore, Thailand and Viet Nam