

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Applications and Economic Benefits (5)

Author: Mr. Joel Ondego Botai
University of Pretoria, South Africa

Prof. Ludwig Combrinck
South Africa

Mr. Hannes Rautenbach
University of Pretoria, South Africa

ON THE GLOBAL GEODETIC OBSERVING SYSTEM: AFRICA'S PREPAREDNESS AND
CHALLENGES

Abstract

Space geodetic techniques and other satellite missions play a crucial role in the determination and monitoring of geokinematics, Earth's rotation and gravity fields. These three pillars of geodesy provide the basis for determining the geodetic reference frames with high accuracy, spatial resolution and temporal stability. Furthermore, recent advances in modern geodesy have led to fundamental improvement in all areas of navigation, transport, process control (e.g., farming, mining), construction and monitoring of infrastructure (e.g., off-shore platforms, bridges), surveying and Earth observation. In addition, SGT have been used for the assessment of geo-hazards, anthropogenic hazards and in the design of early warning systems for hazard and disasters. In general, SGT provide products for Earth observation, science and influence many activities (e.g., building and management) in a modern society. In order to further promote the application of SGT methods to solve Earth science problems, the Global Geodetic Observing system (GGOS) of the International Association of Geodesy (IAG) was commissioned. GGOS is an important geodetic infrastructure that integrates different geodetic techniques (such as Global Navigation Satellite Systems (GNSS), Very Long Baseline Interferometry (VLBI), Satellite Laser Ranging (SLR), Interferometric Synthetic Aperture Radar (InSAR) and the Doppler Orbitography and Radio-positioning Integrated by Satellite (DORIS)), models and analysis techniques for the purpose of ensuring long-term, precise monitoring of geodetic observables vital for monitoring Earth system processes. Since the inception of GGOS, there has been considerable progress made towards setting up the GGOS infrastructure necessary for the establishment of GGOS database. While the challenges that beleaguer GGOS are acknowledged (atleast at global level), the assessment of GGOS infrastructure in the African context is necessary, yet lacking. In the present contribution, a) the African preparedness and response to the observing system, GGOS is assessed, and b) the specific scientific and technological challenges of establishing a regional GGOS hub for Africa are reviewed.