

IAG Webinar Africa (a)



March 3rd, 2023 – 8:00 am (CAT)

Coordinators: Ghislain ZANGMO TFOGOM
University of Maroua

08:00

08:05



Welcoming address

Ghislain ZANGMO TFOGOM, *Member of the Executive Committee of the IAG*

Promoting African Geomorphology

Renée E Grundling, Department of Geography, Geoinformatics & Meteorology, University of Pretoria, South Africa

Although the Earth's topography is shaped by geomorphological processes, the field of geomorphology is a lesser-known scientific field compared to subjects such as geology and physics. Promoting geomorphology amongst different audiences and sectors can have its challenges. Utilising conferences, field excursions, workshops and social media, geomorphologists can collaborate with scientific networks, educational institutes, and non-profit organisations. Various successful initiatives have been launched by organisations like the International Association of Geomorphologists and its members. This presentation will show how Africa - rich in geomorphic landforms and processes – can promote geomorphology.



08:05–08:20

Modelling Land Subsidence Risk with Sentinel-1 across a selected region of South-eastern Nigeria

Olanrewaju Lawal, Department of Geography & Environmental Management, University of Port Harcourt, Nigeria

The study investigated the short-term land displacement across parts of southeastern Nigeria. SENTINEL-1 Synthetic Aperture Radar (SAR) were for the first Quarter of 2020 to quantify land displacement and model the area at risk of land subsidence. Using differential SAR interferometry, the study revealed that land displacement ranges between -20 and 14cm (SD=2.9). Upwardly displaced areas were displaced on average by 0.65cm and -0.68cm for the downwardly displaced areas. With downward displacement occurring across 82% of the area, high-risk areas for subsidence were identified. The study showcased a monitoring framework for land displacement and potential aquifer system changes.

08:20–08:35



Geoheritage inventory and geotouristical valorization of Toujene – Zmertene – Tebaga of Medenine area (Southeast Tunisia)

Rihab ABDELKEBIR, Faculty of Humanities and Social Sciences of Tunis, Tunisia

The Toujene – Zmertene – Tebaga of Medenine area is part of the northern Dahar plateau. The landscape is characterized by its richness in geomorphological and geological heritage. Taking advantage of the geomorphological context, the population has, for a long time, been adapted to the physical environment conditions, including the arid climate. They have produced many forms of cultural heritage. Based on a geoheritage approach, several geosites have been identified and inventoried. In order to enhance the value of these geosites, geotouristic mapping, based on geomorphology, has been undertaken.



08:35–08:50

Inventories of geomorphological factors and mass movements along the Southern Escarpment of the Bamileke Plateau

Raoul Merlin NDNBOU, Department of Earth Sciences, University of Dschang, Cameroon

The Southern Escarpment of the Bamileke Plateau (SEPB) is an area that concentrates a significant risk with regard to all vulnerable sites inventoried. It is a question of grouping together geomorphological factors and mass movements caused by these factors. This objective is achieved through an inventory of vulnerable sites, followed by the identification of geomorphological factors. It appears that the SEPB consists of 80 old and recent mass movements. Slope, slope curvature, slope morphology and direction are the geomorphological factors that affect the occurrence of these mass movements.

09:05–09:20



Paleo karst geomorphology of Qarat Umm Al-Saghir, western desert, Egypt

Noura FAYAD, Primorska University, Slovenia & Damanhour University, Egypt

Qarat Umm Al-Saghir is a small isolated oasis, affiliated to the Siwa center in Matrouh Governorate. The main geological lithology of the study area composed of two geological formations due to the Miocene; firstly, Marmarica Formation, it is mostly made up of alternating limestones and dolostones. Secondly, the Moghra Formation, it lies beneath the Marmarica Formation and unevenly overlies the Middle Eocene Mokattam Formation. In Siwa Oasis the summers are long, sweltering, arid, and clear and the winters are cool, dry, and mostly clear. The climate of Siwa is highly arid. Qarat Umm Al-Saghir depressions (uvalas) are dominated by exposed (surface) complex karst features such as unroofed caves, widened joints, sinkholes, collapse breccia's, and solution channels, together with sporadic remains of uncovered autochthonous and allochthonous paleo-cave sediments.



09:20–09:35

Mapping of flood-prone areas from an extreme water level of 100-year occurrence on a low sandy barrier beach (Langue de Barbarie, Saint-Louis, Senegal)

Cheikh Omar Tidjani CISSÉ, Laboratory Leïdi "Dynamics of the Territories and Development", Department of Geography, University Gaston Berger, Saint-Louis BP 234, Senegal

In order to map the extreme coastal water levels induced by the 100-year swell on the Langue de Barbarie (Saint-Louis, North Senegal), we used the empirical model of Holman (1986), modified by Nielsen and Hanslow (1991) and a high spatial resolution (2 m) numerical elevation model (DEM) derived from Pleiades satellite data. The results show a variability of the spatial extension of the flood wave on the coastal line studied. Thus, 88% of the territory of Gueth Ndar would be submerged, while 68-69% of the districts of Ndar Tote and Goxxu Mbathie respectively would be flooded by the 100-year swell.

09:50–10:05



INTERNATIONAL GEOMORPHOLOGY WEEK 2023

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10:05–10:20



Links between hydrology and vegetation zonation at Malolotja Nature Reserve, Eswatini *Thandeka Ndlela, Department of Geography, Geoinformatics & Meteorology, University of Pretoria, South Africa*

Malolotja peatland occurs at an elevation ranging from 1410-1435 m in a grassland valley with fairly steep slopes. It consists of a channelled valley bottom mire with groundwater input from various springs in seep zones and an unchannelled valley bottom system. A stream containing patches of burnt peat flows through the complex. The northern and central areas of the peatland have a shallow water table and are mainly characterized by a variety of mixed herbs, grasses and sedges, while the peripheral areas have a deeper water table and mainly consist of shrubs and grasses.

Different morphological faces of a microtidal cross-shore profile: the case of south-east Ivorian beaches

SAIMON Aby A. Mathurin, Center for oceanological Research, Abidjan, Ivory Coast

Sandy beaches are a prime example of coastal erosion. With the sad scenery reflected by the sometimes spectacular destruction of the infrastructure often above the TC that the landscape offers after the passage of erosion, the coastal morphology is increasingly studied. This study seeks to understand the different morphological faces of a cross-shore beach profile in a tidal tidal cycle. Altimetric monitoring of the submerged foreshore has therefore been deployed on the south-eastern Ivorian sandy coastline by implantation every 2 m of iron rod. -For moderate swell conditions ($H_s < 1.5\text{m}$) and low marsh conditions $< 0.5\text{m}$) the beach fattens to the edge of the low sea and erodes to the water in the vicinity of the open sea. - For moderate swell conditions ($H_s < 1,5\text{ m}$) and moderate tide conditions ($0,5\text{ m} < \text{tide} \leq 1,0\text{ m}$), the beach erodes to the point near the low sea and fattens to the water in the vicinity of the open sea. - For heavy swell conditions ($1,5\text{m} < H_s \leq 2,0\text{ m}$) and moderate tide conditions ($0,5\text{ m} < \text{tide} \leq 1,0\text{ m}$), the beach erodes in the tide cycle.



10:20–10:35

10:35–10:50



DETECTION AND MONITORING OF THE SPATIO-TEMPORAL DYNAMICS OF WIND ACCUMULATIONS IN ARID REGIONS (1985-2018): CASE STUDY: JEFFARA (SOUTHEAST TUNISIA).

Nesrine ARAK, University of Paul-Valery Montpellier 3, Tunisia

The Jeffara has been subjected to intense and inappropriate anthropic actions associated with unfavorable physical and climatic factors. These actions had caused the deterioration of the vegetation that protects a sandy-silty soil, had favored the intensification of deflation and, had caused the accentuation of wind dynamics. The latter is considered one of the most spectacular phenomena in the Jeffara region. Throughout the study area, we observed the spatial dominance of either accumulation zones or wind deflation zones. Due to the importance of the wind dynamics in the Jeffara, we tried to identify the wind deposition zones based on radiometric indices calculated from two satellite images from two sensors (*LandsatTM-1985* and *Sentinel2-2018*) and to follow their evolution over time.

Life along a peatland: The Molopo Peatland

Ayabonga M Gangathele, Department of Geography, University of Free State, Bloemfontein, South Africa

Peatlands provide a vast array of ecosystem services, making them very attractive for those seeking to benefit from these ecosystem services. This was the case for the residents of Molopo Private Park who own residential properties adjacent to the Molopo Peatland. The beautiful scenery and exposure to biodiversity were the basis of buying property in the area. This soon changed when the peatland degraded drastically resulting in peat desiccation and fire which devastated this community. The residents suffered severely from the fire with one resident getting burnt. Not all hope is lost for Molopo peatland as surface water flow has been re-established.



11:05–11:20

Current Morpho-Sedimentary Dynamics in the Gambara River Valley in Northern Togo (West Africa)

Dr KANKPENANDJA Laldja, Department of Geography, University of Kara, Togo,

The Gambara River valley in northern Togo is experiencing morpho-sedimentary dynamics manifested by the erosion of the banks and the alluvial deposits leading to the disturbance of river ecosystems, the premature clogging of reservoirs and the reduction of water resources. The objective of the study is to characterize this morpho-sedimentary dynamics. The methodology consisted in making topometric surveys, processing satellite images and prospecting surface materials. The results obtained reveal a morpho-sedimentary dynamic characterized by a high mobility of the banks (1.7 m/year) and a sedimentation rate of 0.16 m/year. Land use is the main cause of this intense morpho-sedimentary dynamics.



11:20–11:35

The effect of Global Digital Elevation Models on determining the Geomorphological Stages of dry Wadies in some Basins East of the Gulf of Suez (Egypt)

Alaa Salah Othman Hassan, Demonstrator, Department of Social Studies, Mansoura University, Egypt

Determining the geomorphological stage of the dry Wadies is important to know the geomorphological processes. This paper aims to calculate the values of the hypsometric integration of the Wadies in some basins East of the Gulf of Suez in Sinai and to determine the difference in the results. The study will depend on Global Digital Elevation Models with different spatial resolutions and different sources, using (Model Builder) in GIS to calculate morphometric and topographical data, using the (Pike, Wilson) model, and depending on Strahler's division of the geomorphological stages. The results will show the effect of digital elevation models on determining the geomorphological stages of the Wadies.



11:35–11:50

INTERNATIONAL GEOMORPHOLOGY WEEK 2023

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Environmental impacts of the Exploitation of Geomorphological Heritages in the Anié Watershed (Central-Togo, West Africa)

Dr. Massama-Esso Kabissa, Department of Geography, University of Lomé, Togo

In the Anié watershed, the enhancement of geomorphological heritage leads to environmental degradation through the exploitation of various materials (gravel, sand, laterite, cuirasses and marble) and agricultural practices. This study aims to analyze the impacts of these activities based on a methodology based on documentary research, observations and field work with the use of GIS. The results show a degradation of vegetation cover and soils, changes in topography, a resumption of bank erosion, etc. A strategy for the sustainable management of natural resources has been proposed.

INTERNATIONAL GEOMORPHOLOGY WEEK 2023

Speleological evolution of phreatic paleokarst of Ghar Kriz Cave, Jbel Chetlou (Tunisia)

Emna Sbei, Department of Geography, Faculty of Humanities and Social Sciences of Tunis, Tunisia

The geomorphological study conducted in the Ghar Kriz cave located in Jbel Chetlou (NW Tunisia), illustrates a model of speleogenic evolution of endokarst system and "phreatic paleokarst". Field observations and sample treatment of carbonate deposits (stalagmite concretion) and fine deposits (silty clay) are crucial to analyze the karstic environment and conceptualize the scenario of cave's speleogenic formation. Two main speleogenic phases are identified. The first phase represents the phreatic phase of the cave probably belonging to the pre-middle Pleistocene. The second is the dewatering phase that started from the Middle Pleistocene (478823 ± 21,457 years BP) until now.



12:05–12:20

Dynamics of Riparian Cover along River Niger and River Benue using GIS and Remote Sensing

Dr. Olutoyin A. Fashae, Department of Geography, University of Ibadan, Nigeria

Large rivers are endowed with robust riparian resources, but incessant anthropogenic disturbances have been militating against the sustenance of the associated ecosystem functions, thereby tampering with the ecosystem services offered by this unique habitat. This study evaluates the dynamics of riparian cover of Rivers Niger and Benue, between 1984 and 2019 using TM, ETM+, and OLI Landsat imageries using remote sensing technique. Riparian vegetation was observed to experience severe depletion. This could be attributed to changing climate and floodplain agriculture. There is need for river basin development authorities to implement policies that can discourage riparian overexploitation.



12:20–12:35

Evaluation of low-cost drones in mapping underwater geomorphology of Fintas beach in Kuwait

Ahmed Hassan, Faculty of Education, Matrouh University, Egypt

Peatlands provide a vast array of ecosystem services, making them very attractive for those seeking to benefit from these ecosystem services. This was the case for the residents of Molopo Private Park who own residential properties adjacent to the Molopo Peatland. The beautiful scenery and exposure to biodiversity were the basis of buying property in the area. This soon changed when the peatland degraded drastically resulting in peat desiccation and fire which devastated this community. The residents suffered severely from the fire with one resident getting burnt. Not all hope is lost for Molopo peatland as surface water flow has been re-established.



12:35–12:50

Spatial Assessment of the Variation in Gully Morphological Parameters across Land Covers and Lithological Units of Upper Imo River Basin (UIRB) Southeastern Nigeria

Chibo Christian Nnamdi, Department of Geography and Environmental Management, Imo State University, Nigeria

Globally, the development of gully morphological vary with land covers and lithology. This research analyzed the variations in morphological parameters of gullies across land covers and lithological units of the Upper Imo River Basin, Nigeria while investigating the land cover change between 2003 and 2018. Eighteen gully sites were systematically among the land cover and lithology. Length, width, depth, and area were determined through standard field measurement and GIS analysis. There were five major land covers which shows substantial change during the study period. Three lithologies were affected by gullies and their morphologies vary across these lithology and land covers within the study area.



13:05–13:20

Coastal risk assessment on the Keta (Ghana) - Lomé (Togo) area using the Coastal Hazard Wheel (West Africa littoral)

Dr. Kouami Dodji Adjaho, Department of Geography, University of Lomé, Togo

Due to the high density of land occupation, the coastal area from Keta to Lomé is vulnerable to hazards such as surges, submersion, coastal erosion, salinization etc. The objective of this study is to assess the levels of coastal risks to which the human, economic and environmental issues are exposed. The methodology used for hazard characterization is based on the Coastal Hazards Wheel Tool. The results indicate that hazards are rated on a four-level scale: « Low », « Moderate », « High » and « Very High ». Research perspectives focus on the economic impacts of the coastal vulnerability.



13:20–13:35

13:35

13:40



Closing address

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