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# ABSTRACTS VOLUME

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change in slope of both the surfaces and river-beds helps understand the tectonic activity during the Quaternaries and predict the vulnerability of these areas in future earthquakes.

*Keywords:* Tectonics; Geomorphology; Scarps; Terraces; Drainage

*THEME: S33 TECTONIC GEOMORPHOLOGY (IAG-EGU JOINT SESSION)*

**ABSTRACT NUMBER: 718**

## Alluvial Terraces Of The Chel River Valley, Foothills Of Darjeeling Himalaya, India: Imprints Of Geomorphic And Tectonic Processes

**Rimpal Kar[1]***

[1]Geological Survey of India, Hyderabad, Telengana, India
(*Corresponding Author: rimpal.kar@gmail.com)

A number of rivers draining the Darjeeling-Sikkim Himalaya meet the low-gradient foreland alluvial plain, where the terraces are formed due to aggradation and degradation of river systems over a period of time driven by the interplay of forces of tectonics and climate.

The present study was to evaluate possible role of tectonics and other autogenic processes in the formation and present disposition of the Chel River terraces, in a 7 km long valley-confined stretch at the foothills of Darjeeling Himalaya. Six fill terraces are recognized and can be categorized in two groups: a) two older, unpaired, east-bank terraces (T6, T5) that occur 300 to 450 m above the modern river; b) a set of four younger, paired terraces (T4-T1) occurring at lower elevations. High (>5.1°) slope of T6 and folding of T5 is probably related to the movement along the Gorubathan Thrust (GBT). The younger set of terraces (T4-T1) converge southward at the mountain front with slope varies between <3.2° to 2°. The coarsening upward gravelly successions of T4 and T3 are inferred to be deposited by progradation of valley-bound telescopic fan. Relatively finer gravels of T2 and T1 were deposited in braided alluvial plains. Hypsometric analysis of the Chel catchment basin does not reveal any influence of tectonic movements. The present study infers that the southward convergent pattern of the younger terraces is a result of decreasing slope of the fan-river system in response to progressively increasing water:sediment ratio in the precursor streams, not tectonic tilting. And this was probably driven by changes in climate, sediment supply and geomorphology of the catchment basins. The disposition of the upper, unpaired terraces and the proposed non-tectonic origin of the downstream convergent lower Chel terraces has important bearing for timing of movement along GBT (~35-40 ka).

*Keywords:* Himalaya; Terrace morphology; Climate change

*THEME: S33 TECTONIC GEOMORPHOLOGY (IAG-EGU JOINT SESSION)*

**ABSTRACT NUMBER: 782**

## Physically-Based Segmentation Of The Land Surface For Morphotectonic Analysis

**Jozef Minar[1]*; Peter Bandura[1]; Lucian Drăguț[2]**

[1]Comenius University in Bratislava, Bratislava, Slovakia; [2]West University of Timişoara, Timişoara,Romania
(*Corresponding Author: jozef.minar@uniba.sk)

Use of input geomorphometric variables that directly reflect basic physical-geomorphic categories is a basis of physically-based land surface segmentation. Definition of input morphometric variables depends on the character of target geomorphic objects. For identification of basic morphotectonic units (morphostructures) of the Western Carpathians we used elevation of envelope (original) surface as a measure of detectable unit endogenous geomorphic work, Glock's available relief as a measure of detectable unit exogenous geomorphic work, and ratio of amplitude (relief) and half of wave length (double of mean distance from the stream) as a measure of available gravity force of formed land surface. Concept of topographic grain should be used to determine the computational windows. The variables were derived from the SRTM V4 dataset as well as from the TanDEM-X dataset. We subsequently applied our original object-oriented workflow consisting of multiple iterative segmentations based on the ESP 2 tool and classifications in the eCognition Developer software. Results of the segmentation do not principally differ from the segmentation using the related variables as elevation, vertical dissection, and slope; however, morphotectonic interpretation is more straightforward. Ratio of endogenous and exogenous work reflects, in line with existing geochronological data, age and rapidity of the uplift. Spatial differentiation of geomorphic works and their ratio enables to test the hypothesis of different sequentiality of the dome-like neotectonic uplift of the Western Carpathians as well as development of particular 'delayed' (later uplifted) mountains. Additional consideration of available gravity force of formed land surface is important from the point of view of influence of lithological differences on formation of the morphostructures.

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*Keywords:* geomorphometry, OBIA, geomorphic work, Western Carpathians

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**ABSTRACT NUMBER: 787**

## Morphotectonic Of Regolith Landsurfaces In Cameroon (Central Africa): Weighting The Evidences Of Late Cretaceous Uplift And Climatic Deep Weathering And Stripping

**Mathieu Momo Nouazi[1]*; Anicet Beauvais[2]; Paul Tematio[1]**

[1]University of Dschang, Dschang, Western Region, Cameroon; [2]Aix-Marseille Université, Aix-En Provence, Marseille, France
(*Corresponding Author: nouazimat@yahoo.fr)

In the last few decades, a range of regolith-related issues highlighted their usefulness on assessing landform dynamics for better understanding and quantifying earth surface processes. A model for the evolution of weathered landsurfaces in Cameroon is developed using available tectonic evidences and geophysical anomalies (i.e. crustal thickness and gravimetric anomalies), sedimentological data and regolith morphology. On deformed orogens, the model demonstrates the pivotal role of uplift, consequent volcanic cover and rheology-dependent gravitational collapses in inducing large scale compartmentalization. In areas of tectonic quiescence, it enhances a well known predominance of deep weathering and striping resulting in a morphogenetic sequence similar to that of climate-dependent dynamics on the West African craton. These schemes in accordance with regional correlations allow determining four regolith landsurfaces recognizable with their actual relicts and their specific petrogeochemical patterns. These are the high glacis, the widespread Intermediate ferricrete, the African bauxitic surface, and the modern bauxites developed on Neogene volcanics across the so-called Cameroon Volcanic Line. These finding provide a unique geomorphic record resulting in interplay between late Cretaceous epeirogeny, heterogeneity of uplifted basement, and climate variability. It helps narrowing a gap on understanding the dynamics of the complex geomorphic system of the African tropical belt, and specifically in Central Africa where no tectonic input were considered in old issues. It also stands as basis for assessing denudation rates and their comparison with weathering-limited steady cratonic denudation of West Africa, and to investigate Cenozoic drainage rearrangement and stabilization as a consequence of uplift.

*Keywords:* regolith landsurfaces; epeirogeny; gravitational collapses, climate variability; Cameroon

*THEME: S33-A : TECTONIC GEOMORPHOLOGY OF KACHCHH BASIN*

**ABSTRACT NUMBER: 246**

## Scarp Development And Neotectonic Response Of Uplift Induced Erosional Landscape Along The Seismically Active Kachchh Mainland Fault (KMF), Western India.

**Mohamedharoon Shaikh[1]*; Deepak Maurya[1]; Naimisha Vanik[1]; Laxman Chamyal[1]**

[1]The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India
(*Corresponding Author: mhs_vad@yahoo.co.in)

The Kachchh Mainland Fault (KMF) is a roughly E-W trending fault in the seismically active Kachchh palaeorift basin. The present study deals with the western part of the KMF where strike of the fault swings to WNW-ESE. The fault delimits a chain of asymmetrical domes composed of Mesozoic rocks characterized by sub-vertical to vertical northern limbs forming the KMF scarp and the southern limbs with gentle dips. The domes studied include the Jumara, Jara, Bana, Mundhan, Ghuneri and Karanpur domes. All domes show rugged, hilly topography with northward flowing incised bedrock rivers. The geomorphic and stratigraphic evidence suggest a progressively westward decreasing magnitude of uplift from Jumara dome in the east to Karanpur dome in the west. Development of another E-W trending Jaramara scarp to the south of the KMF scarp conforms to the higher magnitude of uplift in the eastern part. The Jaramara scarp, higher in elevation than the KMF scarp, is a simple cuesta scarp, formed in the gentler southern limbs of the Jumara, Jara and Bana domes. We attribute the development of the Jaramara scarp to comparatively higher magnitude upliftment of the Jumara, Jara and Bana domes. The formation of the Jaramara scarp was accentuated by the presence of a large intrusive body, the Ukra intrusive on the back slopes of the scarp. Deeply incised Quaternary miliolite deposits, deep gorges and knickpoints in the Jaramara scarp provide evidence of post miliolite uplift of the domes in response to coseismic movement along the KMF.

*Keywords:* Scarp morphology; Jaramara scarp; Neotectonics; Kachchh Mainland Fault (KMF); Kachchh basin