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Denudation and Accumulation Surfaces on the Northeastern Side of Lake Tonle Sab, Cambodia

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Situated in a WNW-ESE trend tectonic depression, Lake Tonle Sab fluctuates its level annually between c.2m and 10m a.s.l. under the influence of the Mekong in the seasonal tropical climate. Geomorphological reconnaissance was carried out on the northeastern side of the lake with supports of satellite-image and air-photo interpretation and borehole-core observation. The area consists of the following four geomorphic units: High Plateau, Foot Plateau, Gently Sloping Plain, and Lake Margin. The former two are of denudational origin while the latter two are accumulational. The Foot Plateau, on which thick red soil profiles with laterite are developed, descends underneath the Gently Sloping Plain, which is subdivided into the Upper, Middle and Lower zones and composed of c.60m thick alternation of sandy and muddy layers with several weakly laterized horizons. The characteristic landform assemblage, on which the Angkor historic sites are located, is considered to have developed in the environment of lake-bottom subsidence, annual lake-level fluctuation and long-term change of its range, and differential sediment supply from neighboring highlands composed of weathered Mesozoic/Paleozoic rocks.

Keywords: denudation surface, fan-delta, lake margin, lake-level, seasonal tropics

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Geomorphological Map of the Argentera Massif, Western Alps, Italy

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The Argentera Massif, frequently exceeding 3000 m in height, is located in the southwestern edge of the Alpine chain (Maritime Alps). A geomorphological map (1:25.000) covering an area of about 35 km^2 synthesizes ten years' research. Morphostructural evidence, in particular swath profiles relief data and river network analysis, suggests that the tectonic uplift of the crystalline basement occurred differentially influencing geomorphological evolution. Detailed mapping of glacial landforms permitted to infer the position of the ELA during the Last Glacial Maximum (about 1710 m. a.s.l.); a few lateglacial stages were also identified and the historical and Little Ice Age moraines were dated using lichenometry. Although the climatic characteristics are nowadays unsuitable for the persistence of glaciers, six small ice bodies (ELA is at 2800 m) survive for the inertia of ice masses in particular topographic position. The Mean Annual Ground Surface Temperature, obtained by means of digital data loggers, suggests that rock glaciers with an average location above 2600 m a.s.l. are permafrost affected. Dendrogeomorphological analysis allows to link debris flows occurrence to recent environmental changes. A typical alpine orography combined with an intermediate maritime-continental climate determines here a morphoclimatic equilibrium highly sensitive to environmental changes.

Key words: geomorphological map, morphotectonics, rock glacier, debris flow, Alps.

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Geomorphological mapping and hydrogeologicahazards in North-Western Italy

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Piemonte and Valle d'Aosta regions (NWItaly) during the last decade experienced exceptional rainfall events (maximum of cumulate rainfall: 586 mm in 2226 september 1993, 567 mm in 2-6 november 1994, 740 mm in 13-17 october 2000) which triggered hydrogeobgical phenomena responsible for extensive damages and a hundred of casualties. As a first step in defining hazardprone areas, field and remote-sensing surveys were conducted over the regions for mapping geomorphological features and identifying processesand factors related to present-day natural instability phenomena. In the mountain area (inner slope of the Western Alps) rock falls and debris flows resulted as the more frequent phenomena; in the hilly area (Langhe, Monferrato and Torino Hills), soil slide-debris flow and translational rock block slide prevailed by number and coverage area in inventory maps for slope processes. In both cases, detailed studies highlighted the prominent role of factors such as geostructural and geo-mechanical setting and/or surface-deposits distribution and characteristics, with useful indications for the recognition of premonitory features. In the floo-prone areas of the major valleys and the Po plain, mapping of fluvial landforms of various age were conducted through comparison of field data, multitemporal aerial photointerpretations and studies on the historical record. Geomorphological indicators of both progressive or propulsive fluvial deposition and erosion were identified to provide information on the return time ofhazardous phenomena, in order to fulfill the rising demand for protection from natural disaster in highly built-up areas.

Key words: geomorphological mapping, slope processes, fluvial processes, hazard assessment, North-Western Italy.

The Geomorphological Peculiarity of Khuvsgul Region and its Morphogenetic Forms

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The Khuvsgul region is unique representation of Mongolian nature and it is distinctive from bordering area. The surface of this region has special peculiarity formation of combination of high, middle high mountain ranges, depression between mountains and basin of rivers. One of the peculiarity of this region is distribution of glacial geomorphology. We can find here evident form of moraine, terrace, circue. The terminal moraine is in range of altitude 1600-1750 m. By scientist's views the total glacial area is 16.5 thousand km^2. The central part of the region occupied by tectonic depressions of Khuvsgul Lake, Darkhad and Bus river, from these biggest one is Khuvsgul lake depression, which is famous - fresh water reserviour in Asian continent. In conclution we can say that the geomorphological features of the region is different by origin and morphogenetic type which are divided into the following classes: Tectonic erosion, Volcanic, Erosion, Accumulation.

Key words: relief, erosion, tectonic, glacial, morphology

A Method for the Evaluation of Impacts on Sites of Geomorphological Interest (SGI) in the Frame of Environmental Impact Assessment (EIA)

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The method presented in this paper is quantitative, but a series of qualitative guide lines have been elaborated, in order to give a support for the attribution of the values. The first step is the evaluation of the scientific quality of the asset, according to two attributes: model of geomorphological evolution and paleogeomorphological example. The quality is calculated considering a series of parameters, some strictly linked with the scientific connotation of the SGI, other indirectly linked. These parameters are: expert's knowledge (related to the educational value of the asset and its own value for the research); areal extent (in relation to overall extent of similar sites); rarity (in relation to quantity of similar sites); added value (related to the importance that the asset has for non-geomorphological aspects that nevertheless can increase its scientific value; e.g. tourism, ecology); degree of conservation (depending both of natural and human factors) and exposure (related to the visual impact). The second step is the attribution of a weight to each parameter. Finally, the difference of the scientific quality in a pre-project and post-project situation gives the value of the impact of a human construction on an asset. The method is tested in a sector of the Modena plain (Po Plain, Northern Italy).
Key words: site of geomorphological interest, geomorphology, EIA

Morphological Mapping as Tool for Urban Planning in Southeastern Brazil

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The research was performed in a gully erosion prone, highly dissected area, which is an urban expansion vector in a midsize city in southeastern Brazil. The morphological mapping aimed to identify changes in the typical hillslope profiles that could represent unstable sites for normal hillslope evolution in a tropical environment. For best results, it was stablished a specific legend that could be both intuitive and clear and fit to the type of features observed. The legend focused mainly in the definition of concave and convex features. The overlaying of the morphological map over a gradient map revealed that concave forms associated with critical slope gradients, in this case over 7°, poor vegetation cover, concentrated suface and subsurface flow and the outcrop of wheathered metamorphic rocks, represented threshold situations that were related to the onset of gully erosion.
Changes of slope profiles in the apparently gentle topographic conditions seem to be one of the factors controlling gully erosion. Morphological mapping may then represent a useful tool in the definition of guidelines for safe urban growth.
Key words: morphological mapping, legend, gully erosion, urban growth.