

## REFERENCES

B) The continuous adjustment (or adaptation) of relief to new conditions is created by endo- and exogenic processes changing their intensity and direction with time. In almost every landscape there are old roots (inherited from the past) and superimposed younger forms (products of events). Going back to the past our knowledge about the mechanism and sequences of changes in time is more and more hypothetical (Dorn, 1996; Starkel, 1991). Most of universal forms like slopes are the joint product of alternate formative and stable phases or of perennial adaptation during thousands and millions of years. Therefore, only as the exception (from the rule) may be preserved the «tote Landschaften» (*sensu* Budel, 1977) mainly related to the penultimate morphogenesis (e.g. Last Cold Stage).

### C) Diversity and coexistence

The great diversity of the Earth's surface features reflects the perpetual spatial and temporal variations in energy exchange and transfer of matter, in their acceleration or delay, in continuous destruction and creation.

There exist landscapes with high and low intensity of various processes, with different rates of transformation as well as composed of forms of various origin and age. The complexity of some geomorphic systems may be so high that the linear dynamic model is not acceptable and the system seems to be unstable and chaotic (Phillips, 1996).

Among the intensively transforming landscapes are the ecotonal zones of main morphoclimatic regions and the margins of elevated morphostructures. The lithological diversity and random spatial distribution of extreme events explains the local differences.

Analysing the nature of existence (life) we touch a fundamental question of Creation and Destruction, in which past and future are incorporated.

The old Persian holy book tells what is the Life over the Earth:

*...it sleeps in stone,  
wakes in a plant,  
moves in an animal  
and may be fully realised in the man,  
sounding the question of existence...  
Where is the Relief in this context?  
May be... it is the life's playground, created during  
the perpetual energy exchange and circulation of matter  
showing its resistant but slowly changing face...  
...during repeating waking up, falling asleep and waking up...*

**ABSTRACT:** STARKEL L., *Space and time scales in Geomorphology*. (IT ISSN 0391-9838, 1999).

In studying the origin and evolution of landscape, we use various scales, both in space and time. Most landforms result from interaction of various factors. The author suggests distinguishing the following effective time scales of landform evolution: formative extreme events and secular processes, clusterings of events, phases of higher frequency of extreme events, cyclic changes of longer duration. The assumption about positive correlation between size and age of the forms is frequently not valid.

The existing relief incorporates forms of various origin and age, which have undergone continuous adaptation to new conditions. The author underlines three principal regularities in relief evolution: way to destiny (planation), continuous adjustment to new conditions, coexistence of diverse forms controlled both by tectonic and climatic factors as well as by lithology.

**KEY WORDS:** Geomorphology, Space and time scale.

- BAKER V.R. (1988) - *Overview*. In: Baker V.R., Kochel R.C., Patton P.C. & Wiley J. (eds.), *Flood Geomorphology*, 1-12, Wiley, New York.
- BAKER V.R. (1996) - *Hypotheses and geomorphological reasoning*. In: Rhoads B.L. & Thorn C.E. (eds.), *The scientific nature of geomorphology*, 57-58, Wiley, New York.
- BARSCH D. (1990) - *Geomorphology and geoecology*. *Zeit. f. Geomorph., Suppl.-Bd. 79*, 39-49.
- BAULIG H. (1952) - *Cycle et climat en geomorphologie*. *Laborat.d.Geogr., Univ.d.Rennes, vol.jubilare*, 215-239.
- BRUNSDEN D. (1990) - *Tablets of stone: towards the ten commandments of geomorphology*. *Zeit. f. Geomorph., Suppl. Bd. 79*, 1-37.
- BRUNSDEN D. (1996) - *Geomorphological events and landform change*. *Zeit. f. Geomorph. 40*, 3, 273-288.
- BUDEL J. (1977) - *Klimageomorphologie*. Gebr. Borntrager, Berlin-Stuttgart, 304 pp.
- CHURCH M. (1996) - *Space, time and the mountain-how do we order what we see?* In: Rhoads B.L. & Thorn C.E. (eds.), *The scientific nature of geomorphology*, 147-170, Wiley, New York.
- COSTA J.E. (1988) - *Rheologic, geomorphic and sedimentologic differentiation of waterfloods, hyperconcentrated flows and debris flows*. In: Baker V.R., Kochel R.C. & Patton P.C. (eds.), *Flood Geomorphology*, 113-122, Wiley.
- DAVIS W.M. (1899) - *The geographical cycle*. *Geogr. Journ.*, 14, 481-504.
- DORN R.J. (1996) - *Climatic hypotheses of alluvial fan evolution in Death Valley are not testable*. In: Rhoads B.L. & Thorn C.E. (eds.), *The scientific nature of geomorphology*, 191-220, Wiley, New York.
- DURY G.H. (1964) - *Principles of underfit streams*. U.S. Geological Survey Prof. Paper, 452A, 1-67.
- DURY G.H. (1975) - *Neocatastrophism*. *Ann. Acad. Brasil. Cienc*, 47, 135-151.
- DYLIK J. (1967) - *The main elements of Upper Pleistocene paleogeography in Central Poland*. *Biul. Peryglacjainy*, 16, 85-115.
- FROEHLICH W., STARKEL L. & KASZA I. (1992) - *Ambootia landslide valley in the Darjeeling Hills, Sikkim Himalaya, active since 1968*. *Journ. Himalayan Geol.*, 3,1, 79-90.
- GAMPER M. (1993) - *Holocene solifluction in the Swiss Alps: dating and climatic implications*. Special Issue ESF Project, European Paleoclimate and Man, ed. Frenzel B., Acad. Wiss, Mainz, 1-9.
- GILBERT G.K. (1877) - *Report on the geology of the Henry Mountains*. Washington, 160 pp.
- GROVE J. (1979) - *The glacial history of the Holocene*. *Progr. Phys. Geogr.*, 3 (1), 1-54.
- JAHN A. (1956) - *The action of rivers during the Glacial Epoch and the stratigraphic significance of fossil erosion surfaces in Quaternary deposits*. *Przeglad Geograficzny 28, Suppl*, 101-104.
- KARLEN W. (1991) - *Glacier fluctuations in Scandinavia during the last 9000 years*. In: Starkel L., Gregory K.J. & Thornes J.B. (eds.), *Temperate Palaeohydrology*, 395-412, Wiley, New York.
- KING L.C. (1953) - *Canons of landscape evolution*. *Biul. Geol. Soc. Am.*, 64, 721-752.
- KIRKBY M.J. (1987) - *The Hurst effect and its implications for extrapolating process rates*. *Earth Surf. Proc. Landf.*, 12, 57-67.
- KIRKBY M. (1990) - *The landscape viewed through models*. *Zeit. f. Geomorph., Suppl.-Bd.*, 79, 63-81.
- KLIMASZEWSKI M. (1964) - *On the effect of the preglacial relief on the course and the magnitude of glacial erosion in the Tatra Mountains*. *Geogr. Polonica*, 2, 11-21.
- KNOX J.C. (1975) - *Concept of the graded stream*. In: Melhorn W.N. & Flemal R.C. (eds.), *Theories of Landform Development*, Binghampton Symposium, 6, 169-198.
- KOTARBA A. (1995) - *Rapid mass wasting over the last 500 years in the High Tatra Mountains*. *Questiones Geographicae, Spec. Issue 4*, 177-183.
- KOUTANIEMI L. (1991) - *Glacio-isostatically adjusted palaeohydrology, the river Ivalojoeki and Oulankajoki, Northern Finland*. In: Starkel L., Gregory K.J. & Thornes J.B. (eds.), *Temperate Palaeohydrology*, 65-78, Wiley, New York.