

# L. JAKUCS

## MORPHOGENETICS OF KARST REGIONS



Professor László Jakucs has been an ardent speleologist since his student days in the 1940s. He has discovered and explored many vast cave systems in the karst lands of his native Hungary. In 1948, at the age of twenty-two, he had already achieved such distinction in his investigations of thermal caves and karst waters among the Buda hills that he was honoured with the Pál Vásárhelyi Award. Much of his research has been concerned with problems of public water supply, for a period in the Soviet Union, but principally in the karst region of Aggtelek in northern Hungary. Indeed, he was for ten years the director of the Aggtelek Cave that he had himself discovered and that he presented to his scientific colleagues in a film rated the 'best cave film in the world' at the Second International Congress on Speleology in 1958. The same film won the second prize at the Cannes Festival of Short Scientific Films in 1963. Well known for his many lecture tours abroad and for his books, Professor Jakucs has been director of the Institute of Physical Geography of the József Attila University, Szeged since the early sixties.



# CONTENTS

Introduction	7
<b>I. THE PLACE OF KARST MORPHOLOGY IN SCIENCE</b>	
The karst concept	15
Meaning of the term karst morphogenetics	19
The place of karst morphogenetics among the geosciences	20
<b>II. GENERAL CRITERIA OF KARSTIFICATION</b>	
Presentation of the problem	25
The concept of karst corrosion	26
1. Carbonate dissolution of limestone	26
2. Hydrocarbonate dissolution of limestone	28
3. Non-karstic corrosion of limestone	48
Petrovariance as a factor of karst corrosion	54
1. Specific features of limestone composition	55
2. Influence of limestone crystallinity and lithostructure upon karst corrosion	63
3. Influence of the lithology and limestone structure upon karst corrosion	68
4. Dolomite corrosion	71
5. Dissolution of gypsum and rock salt	78
6. Karst corrosion of polymineral rocks	81
Epeirogenic movements as factors of karstification	86
Climatic control of karstification and the geomorphological consequences of climatic variance	103
1. Karstification in the glacial and periglacial regions of geomorphology	117
2. Karst corrosion in the temperate and Mediterranean zones	127
3. Karst corrosion in the desert zone	129
4. Tropical karstification	130
a) Rain-forest karst	134
b) Inselberg karst	134
c) Karst cone and karst tower	135
d) Intermontane karst plains	136
e) Other characteristic tropical karst forms	137



5. Karst morphological consequences of soil microclimates	141
a) Methods of testing soil gas for carbon dioxide content	152
b) Examples of typical carbon dioxide contents in soil atmospheres of karst microspaces differing in biological and climatic features	157
Authigenic and allogenic karst evolution (the role of erosional variance in karst erosion)	166
1. Features of authigenic karst erosion in the presence of an unchanging local baselevel of erosion	168
2. Erosion of authigenic karst when accompanied by displacements of the local baselevel of karst erosion	172
3. Allogenic (B-type) karst erosion	176
Influence of relief configuration upon the karst process (the geomorphological variance of karstification)	195
The anthropovariance of karstification	200
1. Modifications in erosion due to changes in the natural plant cover of a karst region	201
2. Modifications in erosional processes accompanying anthropogenic inter- ference with the natural hydrology of a karst	207
a) Problems connected with human interference with the intake capacity of shallow-holes	208
b) Influence upon the karst process of human interference with karst springs	221
c) Influence upon the karst process of the regulation of surface and underground stream channel sections	225
d) Influence upon erosion of artificial dams	228
Thematic review of the theses put forward in this book	231
<b>REFERENCES</b>	245
<b>INDEX OF NAMES</b>	269
<b>SUBJECT INDEX</b>	271