



To Professor Dr Jan Zonneveld
 on the occasion of his retirement from
 the chair in Physical Geography at the
 State University of Utrecht,
 which he held for 25 years.

Royal Geological and Mining Society of The Netherlands

DEVELOPMENTS IN PHYSICAL GEOGRAPHY
A TRIBUTE TO J. I. S. ZONNEVELD

PREFACE

This special issue, dedicated to Prof. Jan Zonneveld, contains contributions from his friends and colleagues. It reflects the development in physical geography over the decades of Jan Zonneveld's activities at the Department of Geography at the University of Utrecht. During this time the Department of Physical Geography grew from a small institute with only a few staff members and without laboratory facilities to a modern department counting at present three full professor-

ships, 20 additional staff members and equipped with a good laboratory. The continuing work of Jan Zonneveld resulted in many papers (for a complete list see *Geografisch Tijdschrift*, *Nieuwe Reeks* 17, 1983-4), three books and an ever increasing number of graduates who remember his erudition, enthusiasm and good-humour.

Twenty-five years ago physical geography put the emphasis on descriptive and deductive geomorphology. Since then new concepts, new methods and new applications evolved. The contributions in this volume clearly illustrate these modern

trends. Geomorphological research became more process-oriented and proved to be more and more useful for practical problems.

Another achievement in physical geography is a new view on the landscape: from a static more or less encyclopaedic concept, in which landscape was seen as made up of a number of superposed abiotic and biotic elements, towards a view in which the interaction of these elements by landscape-ecological processes is central. More recently the landscape is seen as a synthesis of abiotic, biotic and noötic (human) interference (see NEEF, this volume). The evolution in the concept of landscape accompanied by an increasing variety of research methods proved to be very useful for physical planning purposes but also in the field of teaching and education.

These general trends of widening the scope of physical geography, the attention of processes active in the landscape and the increasing interest to apply physical geographical knowledge to practical problems lead to reflections about the object and the limits of physical geography, as in the article of GALON.

The reconstruction of palaeo-landscapes, their relief, deposits, soils, vegetation cover and climatic conditions received much attention from physical geographers. Such studies have benefitted much from the everincreasing number of methods for material analysis and dating and from their increased accuracy. The research on characteristics of soil profiles, which reflect the changing environmental conditions and the landscape modifications, is illustrated in the paper by JUNGERIUS & WIGGERS. Other studies of palaeo-landscapes based on geomorphological maps and material properties include papers by JUVIGNÉ, PISSART, TRICART, BIJLSMA & DE LANGE and TEUNISSEN.

Such studies also appear to serve practical purposes. Insight in the palaeo-geographical setting is for instance a great help in determining the extension, properties and permeability of aquifers. Examples may be found in the papers of VAN DEN BERG and POMPER. The use of penetration tests for lithostratigraphical and aquifer research is demonstrated by VAN DER MEENE. Another application of palaeo-geographical studies is presented by TJIA, FUJII & KIGOSHI. These authors analysed the relative changes in sea level in Malaysia to gain insight in possible future sea levels.

The determination of the spatial distribution of phenomena and the understanding of their behaviour is one of the main subjects of physical geography. Mapping is an excellent tool to achieve this goal. Different types of mapping systems evolved and comparisons gave valuable insights into the possibilities for the use of geomorphological maps (c.f. the contribution by VAN DORSSER & SALOMÉ). TEN CATE's paper illustrates some applications of the Dutch geomorphological maps. MEIJERINK, VERSTAPPEN & VAN ZUIDAM discuss future developments. They sketch the evolution from analytical geomorphological maps (depicting morphology, morphometry, morpho-genesis and morpho-chronology) via synthetic maps (showing also soil, hydrology and vegetation-land use

information) toward pragmatic maps, e.g. natural hazard maps, especially made for practical purposes. In the future they foresee the development of geo-base information systems. Handling of these data bases and transformation of the data may produce special thematic maps. VINK's paper is an illustration of the possibilities of such a data base. Statistical techniques are used to produce a statistically reliable differentiation of landscape-units. In every unit the most discriminatory properties are selected to gain a reliable legend for a landscape-ecological map. Other examples of thematic maps may be found in the papers of KOOISTRA and of COLARIS. The latter paper gives a description of a landscape-ecological study which was the base of a Nature and Landscape Conservation Plan incorporated in a regional development plan.

Physical geographical studies into the properties and potentials of the present day landscape are used increasingly for all kinds of purposes. They contribute to regional planning (COLARIS), to land-use planning (SCHOLTEN), to drainage basin training (SCHOUTEN), to soil erosion and land degradation problems, and to risk-assessment. From the latter, two examples have been included in this volume. RIEZEBOS reports on a model of a tropical rain forest, developed to estimate the risk of savannisation and of the increase in sediment production as a result of the possible future creation of the artificial Kabalebo lakes in Surinam. VAN STEIJN & VAN DEN HOF applied risk analysis to town planning in an unstable mountaineous area. Their study resulted in a slope stability map that is mainly based on geomorphic data and lithology.

Studies on processes active above and below the surface which produce changes in (parts of) the landscape benefit very much from the achievements of other sciences: mathematics, hydrology, fluid and soil mechanics, geochemistry, etc. Examples in this volume are provided by VAN ASCH who used soil mechanical principles in a palaeo-slope analysis in the Ardennes region, by VAN DEN BERG and by RIEZEBOS.

The papers collected in this special issue cover a broad range of topics from the field of physical geography. They illustrate that where the object of physical geography is well established (cf. GALON), the choice of its methods and of tools provided by other sciences is a pragmatic one. They also illustrate that physical geography is a young and flourishing field that has numerous strong bonds with the earth sciences. Jan Zonneveld in his long career is to be thanked for his contribution to this vigorous growth.

The editors express their warm thanks to all who contributed to this volume: authors who provided us with manuscripts, the Editorial Board of *Geologie en Mijnbouw*, and the referees.

During the preparation of the volume we mournfully learned the decease of Sytse Bijlsma, one of the contributors. His posthumous paper (with G.W. De Lange) clearly indicates the significance of his scientific work.

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