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Neuere und feinere Messmethoden geodätischer und geophysischer Art sind inzwischen ausgearbeitet worden und werden in Zukunft eine Rolle spielen. Die Landhebung und Kippung zeitigen mancherlei Folgen : Vermoorung durch Abnahme des Gefälles in weiten Gewässernetzen, Verlegung des Ausflusses der grossen Seen, und Verlegung der Wasserscheiden, manchmal auf katastrophale Weise, sowie mancherlei Züge der Natur- und Kulturgeographie.

Die ganze Entwicklung der Strandlinienforschung zeigt, wie die unikausalen Leitbilder sich zuerst als Gegensätze gegenüberstanden und sich, nach damaliger Ansicht, auszuschliessen schienen bis die gegensätzlichen Prinzipien durch RAMSAY auf einer höheren Ebene zu einem bikausalen Erklärungsversuche zusammengefasst wurden, der bereits anfängt einem multikausalen Leitbilde zu weichen. Wie in der jetzigen Natur alte und neue Tier- und Pflanzentypen nebeneinander leben, so existieren in der Literatur alte und neue Erklärungsweisen nebeneinander.

Abstract

Changing ideas about moving shore lines

The displacements of the shore lines and related phenomena have puzzled man since ancient times. Scientific research on the dimensions and rate of these movements and their interpretation began towards the end of the XVIIth century, mostly in Fennoscandia. Several explanations were proposed : on the one side the rise or fall of the sea-level as a consequence of diminution or increase of oceanic waters or of their displacement ; on the other side the deformations of the Earth's crust. During a first period discussions were mostly limited to Fennoscandia. They brought to light many valuable observations, methods and interesting reasonings. Measurements were started. The different explanations were considered, as in the next century, as excluding one another. There existed no background of geological concepts and the chronological scale was limited by theological doctrines.

At the beginning of the last century a new discussion began, this time on an international level. Two unicausal hypotheses continued to be opposed, but the debates took place in a very different setting of geological knowledge, chemical and physical discoveries, geographical information and general scientific concepts, especially on chronology. The antagonism was sharpened.

As a consequence of the development of Earth-sciences, research on the displacements of the shore lines branched out into two groups : one directed its attention towards the observation, synthetic treatment and interpretation of the records of the recent geologic past ; the other tried to measure as exactly as possible the present-time movements.

Geological investigation starts a new period soon characterized by the bicausal concept of interference between crustal movements and the changing sea-level. It had a marked tendency to reconstruct, first of all, as exactly as possible the succession of the events. The search for immediate and ultimate

causes had to follow when the space-time picture was exactly established. The collection of data and their insertion into a picture of evolution was greatly influenced by these concepts. They are due to WILHELM RAMSAY, his collaborators and successors. New views were recently to open the way for multicausal explanations. They are mostly due to VÄINÖ AUER and to his comparative studies in South America and Finland.

Results on present-time movements were laid down in more and more accurate isobase-maps. The systems of recent and fossil isobases are similar, so that they can be considered as belonging to the same event. In the beginning research was mostly based on hydrographic recordings, their synthetic treatment and interpretation. Later new geodetical and geophysical methods were introduced and they will play an important rôle in the future.

The land-upheaval has many and varied effects : areas whose drainage gradient diminishes are changed into swamps and marshes ; this is the case over wide areas in the NW of Finland ; lakes shift their outlets, sometimes in a catastrophic way ; the watersheds change rapidly over great distances. Many characteristics of physical, biogeographical and human geography are connected with the tilting of the crust.

The evolution of research on moving shore lines shows several important stages : in a first stage unicausal explanations are opposed and seem to exclude one another. At a later stage the opposed concepts are united into a bicausal model which is the precursor of multicausal hypotheses.