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AN ANALYSIS OF THE DIFFERENT ENVIRONMENTAL GEOLOGY: A BASIC CONCEPTS

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Abstract—
as a relatively new multidisciplinary field of study, environmental geology offers new perspectives on the relationships between humans and the geo-environment as well as fresh terminology and ideas that expand on established ideas. While the geo-environment provides the human community with benefits such as groundwater and mineral resources, as well as other beneficial geologic phenomena that are essential to its existence and evolution, it also poses a threat to humankind through harmful geologic phenomena and creates unfavorable conditions that hinder the advancement of society. Together, these two kinds of geofactors create the environmental and geologic circumstances of a region, which can either promote or hinder human evolution. The geo-environment, environmental geologic circumstances, and geological aspects of the environment are the most important of them. Ensuring the geo-environment's prudent use and protection is environmental geology's primary responsibility in geo-environment management.

Keywords—*Geo-Environment, Geological Factors of Environment, Environmental-Geologic Conditions, Management of Geo-Environment.*

INTRODUCTION

While the geoenvironment provides the human community with benefits such as groundwater and mineral resources, as well as other beneficial geologic phenomena that are essential to its existence and evolution, it also poses a threat to humankind through harmful geologic phenomena and creates unfavorable conditions that hinder the advancement of society. Together, these two kinds of geofactors create the environmental and geologic circumstances of a region, which can either promote or hinder human evolution. as a relatively new multidisciplinary field of study, environmental geology offers new perspectives on the relationships between humans and the geo-environment as well as fresh terminology and ideas that expand on established ideas. The geo-environment, environmental geologic circumstances, and geological aspects of the environment are the most important of them. Ensuring the geo-environment's prudent use and protection is environmental geology's primary responsibility in geo-environment management. The primary function of environmental geology in the management of the geoenvironment is to resolve these issues and result in the sensible use and conservation of the geoenvironment. Over the past forty years, the term "environment" has been utilized. Prof. Wik of Norway provided the first definition of this phrase that was widely recognized, which read as follows: The environment is that portion of the world that interacts with man, that he affects and exploits, and that he adapts to. Subsequently, many definitions emerged that considered the socio-economic relationships in addition to the fundamentally natural scientific meaning. According to the original definition of the environment, the geological environment, or geoenvironment, is that portion of the lithosphere that directly affects how society develops and exists, and that society is exploited and converted by man (Hraöna, 2002). Geoenvironmental components, also known as geocomponents, are primarily composed of rocks, topography, groundwater, and geodynamic phenomena. It is only recently that the definition of the term and idea "environment" has been clear in relation to its creation and application. Until recently, the term "geoenvironment" was synonymous with the lithosphere or the earth's crust, denoting either the subject of geological study or a substance, such as the space occupied by rocks with porosity and Water seeps into the crevices. The term "last meaning" is nevertheless occasionally used today to distinguish between the concept of the rock environment and that which excludes free or non-adhesive water. The extent of human influence with the earth's crust

determines the depth range of the geoenvironment, which is now around 10 km. The system of different branches of geology, such as engineering geology, hydrogeology, economic geology, etc., can be introduced upon the geoenvironment. From the perspective of its area of expertise, each branch describes the geocomponents contained within. For example, the system of engineering-geological conditions is created by geocomponents specified from the perspective of engineering geology. Relevant characteristics of the geocomponents in this system may include their other characteristics or the engineering-geological characteristics of certain human actions (such as building, excavating, and using sand or stone pits, among other activities). Hydro geological, geophysical, and other conditions and factors might be defined similarly. Many of these narrowly defined elements have distinct meanings and have an impact on the objects and relationships that are the exclusive domain of their respective sciences. Nonetheless, a few of them also have an impact on land usage and environmental quality.

HYDROLOGICAL CYCLE

The movement of water in nature is referred to as the hydrological cycle, or the water cycle (Figure 1). Water travels in several phases via the atmosphere, beneath the surface of the land, into the oceans, and back again. The water vapour in the atmosphere condenses and falls to the land as rain, snow, dew, frost, and other precipitation, which wets the surface. That water evaporates in part.

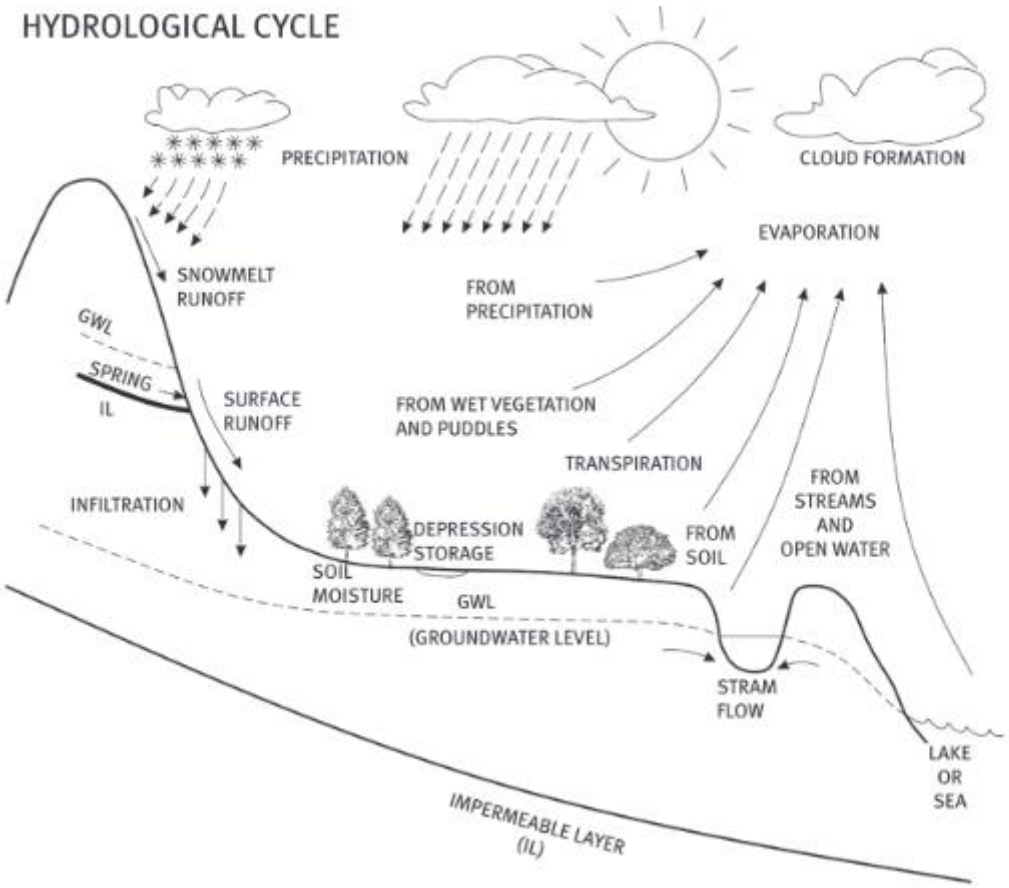

Figure 1- Hydrological cycle

The remaining water either infiltrates into the soil through infiltration or stays on the surface as surface runoff. In the unsaturated zone, water increases soil moisture until it eventually reaches groundwater and groundwater level. Water tends to collect in puddles and ponds as a means of storing depressions or in channels and gullies where it becomes streamflow as surface runoff increases. Groundwater is also the source of streamflow, which eventually finds its way into big bodies of water like lakes and

oceans. Because of sun radiation, wind and enough air humidity, surface water evaporates from precipitation, wet vegetation, puddles and lakes, soil, streams and big water bodies back into the atmosphere where it creates clouds, thus closing hydrological cycle.

A BASIC CONCEPTS OF GEOLOGIC ENVIRONMENT

Over the past forty years, the term "environment" has been utilised. Prof. Wik of Norway provided the first definition of this phrase that was widely recognised, which read as follows: The environment is that portion of the world that interacts with man, that he affects and exploits, and that he adapts to. Subsequently, many definitions emerged that considered the socio-economic relationships in addition to the fundamentally natural scientific meaning. According to the original definition of the environment, the geological environment, or geoenvironment, is that portion of the lithosphere that directly affects how society develops and exists, and that society is exploited and converted by man (Hraöna, 2002). Geoenvironmental components, also known as geocomponents, are primarily composed of rocks, topography, groundwater, and geodynamic phenomena. It is only recently that the definition of the term and idea "environment" has been clear in relation to its creation and application. Until recently, the term "geoenvironment" was synonymous with the earth's crust or lithosphere, denoting either the subject of geological study or a substance, such as the space filled with rocks and the water filling its pores and fractures. The term "last meaning" is nevertheless occasionally used today to distinguish between the concept of the rock environment and that which excludes free or non-adhesive water. The extent of human influence with the earth's crust determines the depth range of the geoenvironment, which is now around 10 km. the geoenvironment provides the human community with benefits such as groundwater and mineral resources, as well as other beneficial geologic phenomena that are essential to its existence and evolution, it also poses a threat to humankind through harmful geologic phenomena and creates unfavorable conditions that hinder the advancement of society. Together, these two kinds of geofactors create the environmental and geologic circumstances of a region, which can either promote or hinder human evolution. as a relatively new multidisciplinary field of study, environmental geology offers new perspectives on the relationships between humans and the geo-environment as well as fresh terminology and ideas that expand on established ideas. The geo-environment, environmental geologic circumstances, and geological aspects of the environment are the most important of them. Ensuring the geo-environment's prudent use and protection is environmental geology's primary responsibility in geo-environment management. The primary function of environmental geology in the management of the geoenvironment is to resolve these issues and result in the sensible use and conservation of the geoenvironment. Over the past forty years, the term "environment" has been utilized. Prof. Wik of Norway provided the first definition of this phrase that was widely recognized, which read as follows: The environment is that portion of the world that interacts with man, that he affects and exploits, and that he adapts to. Subsequently, many definitions emerged that considered the socio-economic relationships in addition to the fundamentally natural scientific meaning.

THE ROLE OF ENVIRONMENTAL GEOLOGY IN THE GEOENVIRONMENT MANAGEMENT

Over the course of his evolution, man used geopotentials to a larger and greater extent, battled geohazards, and overcame geoconstraints by taking ever-more-intricate measurements. However, on occasion, he created geohazards or damaged the geoenvironment on his own while engaging in other activities. Therefore, it may be concluded that environmental geology's primary responsibility in geoenvironment management is to ensure its prudent use and preservation.

These elements are often included in the notion of reasonable utilisation of the geoenvironment:

- most beneficial in light of financial requirements
- Without negatively affecting the landscape and geoenvironment
- Economic and technical misrepresentation
- Suitable architecture and landscaping

A territory's geoenvironmental features typically allow for a wide range of land use options, including mining for minerals, building for industry and civic society, and building for transportation, using groundwater, and using the area for recreational, hygienic, and athletic purposes. In that situation, the decision-making process aims to determine the optimal land use from the perspective of regional or national economic requirements. Therefore, potential conflicts of interest in a territory are covered by the first demand. The second aspect focuses on the responsible exploitation of the geoenvironment and landscape, meaning that there are no unfavourable outcomes, like the triggering of hazardous geodynamic phenomena (e.g., landslides, erosion, suffocation, etc.), contamination of groundwater and the rock environment, harm to superficial water and biota, etc. The most efficient placement of operations in the landscape and the selection of suitable mining or construction foundation techniques are necessary for the technical and financial unpretending exploitation of the geoenvironment. This requires sites that are either inconspicuous and inexpensive, or that do not require protection against geoenvironmental pollution or stability failure. The final criteria asks for designs that blend in with the environment. This means that any changes made to the geoenvironment or landscape must be both aesthetically pleasing and sound from a technical and ecological standpoint. The aforementioned findings indicate that protecting the geoenvironment is a part of the idea of reasonable usage of it. Why then do we discuss the protection of the geoenvironment separately? The main reasons for this are outdated technological objects that were not constructed in accordance with the guidelines for the geoenvironment's rational use, the possibility of accidents, old ecological loads, and unstable regions (slope movements, erosion, subsidence, sagging, etc.).

ENVIRONMENTAL-GEOLOGIC CIRCUMSTANCES AND ENVIRONMENTAL GEOFACTORS

The system of different branches of geology, such as engineering geology, hydrogeology, economic geology, etc., can be introduced upon the geoenvironment. From the perspective of its area of expertise, each branch describes the geocomponents contained within. For example, the system of engineering-geological conditions is created by geocomponents specified from the perspective of engineering geology. Relevant characteristics of the geocomponents in this system may include their other characteristics or the engineering-geological characteristics of certain human actions (such as building, excavating, and using sand or stone pits, among other activities). Hydrogeological, geophysical, and other conditions and factors might be defined similarly. Many of these narrowly defined elements have distinct meanings and have an impact on the objects and relationships that are the exclusive domain of their respective sciences. Nonetheless, a few of them also have an impact on land usage and environmental quality. These are included into the environmental-geologic conditions (geoenvironmental conditions), which are described as the complex qualities of geocomponets that influence the method and/or quality of exploitation of the landscape and geoenvironment. We refer to these characteristics of the geoenvironment as environmental-geologic factors or environmental geological factors (geofactors). Thus, it follows that we have particular geocomponet qualities, which can be factors of their other properties, geofactors of particular human activities (like building), and geofactors of the surrounding environment. The latter ones stand for the geoenvironment's usable attributes, like its appropriateness for construction and its mineral raw material resources. However, in addition to geofactors known as the environment's geological potentials (geopotentials), which offer opportunities for geoenvironment exploitation, there are additional geofactors known as the environment's geological barriers (geobarriers), which restrict or adversely affect land-use. Geological constraints (geoconstraints), which restrict land use and/or increase the cost of land use (unsuitable foundation soils, susceptibility to landslides, etc.), and geological hazards (geohazards), which pose a

threat to the environment or even human health and life, are included in this category of geofactors. A territory's ambient geologic circumstances are created by the complex of all of its geofactors (Table 1).

Geological potentials	Suitable condition for construction	Available resources of groundwater's	Available resources of mineral raw materials	Phenomena useful in health service, tourism and recreation	Environmental geologic condition of the territory
Geological barriers	Landslides Earth flows Avalanches	Pollution of groundwater's	Subsidence and sagging of the surface	Sheet erosion Wash out erosion	

Table 1- Geological factors of the environment and environmental-geologic conditions of a territory

Making a map is the most effective approach to convey the environmental and geology aspects of a region. Maps of the environment's geofactors often show the geoenvironmental conditions in Slovakia. The maps are made up of multiple map sheets that cover the environmental elements of almost every area of geology, with the majority of the topics being covered by engineering, hydrogeology, geochemistry, economic, geophysics, and pedology. In light of the large number of maps and the high level of specialisation of some of them, an easily understood complete map of important geofactors has been assembled for the objectives of environmental protection and land-use planning.

CONCLUSION

The analysis of the geoenvironment encompasses all environmental characteristics, primarily evaluated from the perspectives of engineering geology, hydrogeology, economic geology, geochemistry, and geophysics. The understanding of other geological sciences, such as petrology, tectonics, mineralogy, and physical geology, is also utilised. Technical knowledge, particularly in the field of geotechnics, is useful in suggesting sensible ways to use the geoenvironment, in resolving issues arising from human intervention with the geoenvironment, and in formulating plans to safeguard the environment against damaging geological processes and pollution. As a result, an environmental geologist must adopt a systemic approach, considering all environmental elements and assessing how they relate to one another, while also being prognostic in order to anticipate both natural development and potential alterations to the geoenvironment brought about by human activity. After doing so, he can make recommendations for the geoenvironment's sensible usage or for safeguarding it against unfavourable geological processes that are caused by human activity or by the natural world.

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