ENV PRO

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The Environmental Science Education for Sustainable Human Health

6 – 13 September 2021

UNIVERSITÀ DEGLI STUDI DELLA TUSCIA · GIRAF PM · NAS RA INTERNATIONAL SCIENTIFIC EDUCATIONAL CENTER · MARTIN-LUTHER-UNIVERSITÄT HALLE-WITTENBERG · UNIVERSITY OF GEORGIA · TÉCNICO LISBOA · GRENA GEORGIAN RESEARCH AND EDUCATIONAL NETWORKING ASSOCIATION

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DURING UPCOMING AN HOUR

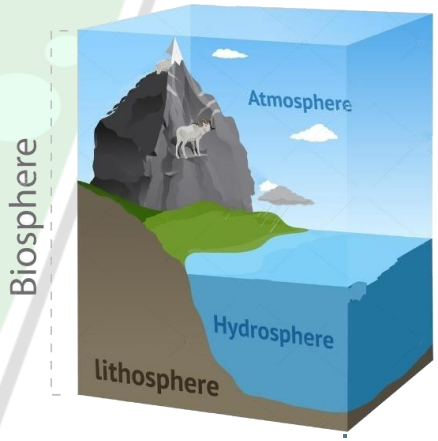
01 Basic concept/terms

02 A theoretical background for research and origin of environmental geochemistry

03 Peculiarities and methods of Environmental geochemistry

04 A case study of Environmental geochemical investigation: from research to nature-based solutions

BASIC CONCEPTS/TERMS

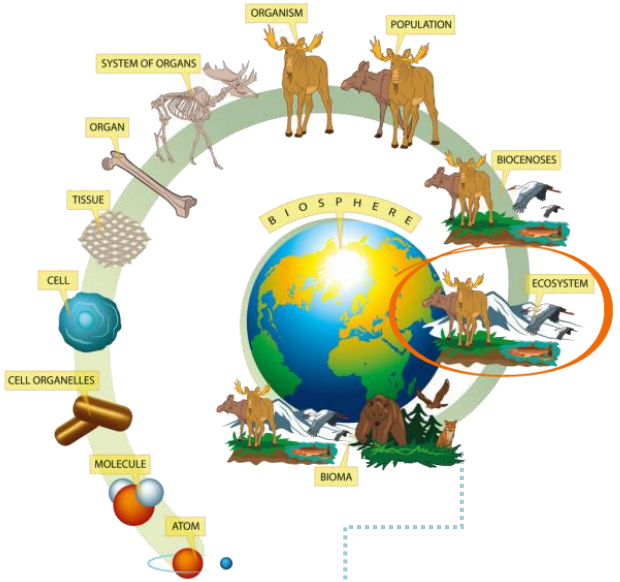


Bioshpere

The sum of all the ecosystems of the world. It is both the collection of organisms living on the Earth and the space that they occupy on part of the Earth's crust (the lithosphere), in the oceans (the hydrosphere) and in the atmosphere. Sphere of life.

Environment

The complete range of external conditions, physical and biological, in which an organism lives. The natural world, as a whole or in a particular geographical area, especially as affected living organisms. Ecosystem of a human.



Ecosystem

An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscape, work together to form a bubble of life. Ecosystems contain biotic or living, parts, as well as abiotic factors, or nonliving parts.

Landscape

A landscape is part of the Earths surface that can be viewed at one time from one place. It consists of the geographic features that mark, or are characteristic of, a particular area..

Neuendorf, Klaus K.E.; Mehl, James P., Jr.; Jackson, Julia A.(2011) Glossary of Geology (5th Edition),American Geosciences Institute, ISBN 978-0-922152-89-6

Michael Allaby(2015) A Dictionary of Ecology (4 ed.),Oxford University Press, ISBN 9780191793158

Geochemical natural province

one of the geochemical zoning units of the heterogeneous Earths surface: an area of certain associations of chemical elements that are in high or low concentrations in rocks, and, accordingly, in soils, and groundwater.

Geochem. Background

a theoretical 'natural' concentration of a substance in a specific environmental sample (or medium), considering the spatial peculiarities.

Anomalies

An entity or property that differs from what is typical or expected, or which differs from that predicted by a theoretical model. May be the measurement of the difference between an observed or measured value and the expected values of a physical property.

Toxic elements

Toxic elements are defined as elements which can be present in amounts that can be potentially hazardous to human health and living organisms.

Chemical elements

any substance that cannot be decomposed into simpler substances by ordinary chemical processes. Elements are the fundamental materials of which all matter is composed.

Contamination and contaminants

Contamination is simply the presence of a substance where it should not be or at concentrations above background. Contaminants are defined as “substances“ or groups of substances that are toxic, persistent and liable to bioaccumulate, and other substances or groups

Pollution and pollutants

Pollution is the introduction of pollutants into the natural environment that cause adverse changes. Pollutants are the contaminants that get introduced into the natural environment, beyond permitted limits, and cause deleterious effects to the inhabitants in a visible way.

Ecological risk

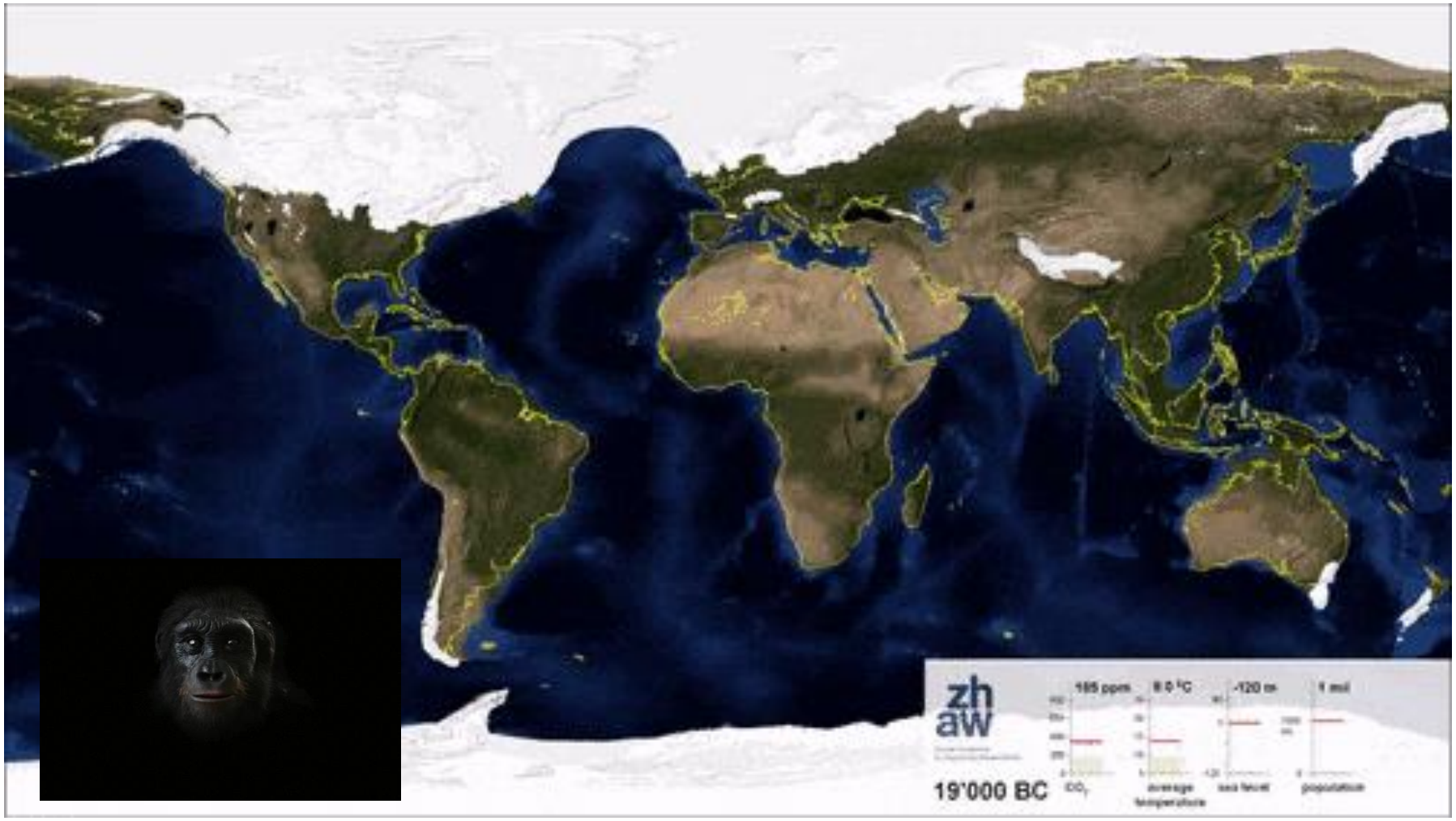
the likelihood of negative changes in the environment or remote adverse consequences of these changes arising from a negative impact on the environment.

Human health risk

the likelihood of developing an adverse effect in an individual or group of people when exposed to a certain dose or concentration of a hazardous agent

Geochemical anthropogenic province

territories with the abnormal content and ratio of macro- and microelements as a result of atypical reactions of living organisms, are completely determined by human economic activity and its consequences.



> … Humanity and the Earth are in one of the most difficult stages of evolution

Peter Ward, Joe Kirschvink (2016) A New History of Life: The Radical New Discoveries about the Origins and Evolution of Life on Earth

EQUILIBRIUM

“

... Equilibrium the entity of certain compounds, properties, factors in space and time required for a phenomenon or a process to form and run.

Citation

ENVIRONMENTAL ISSUES

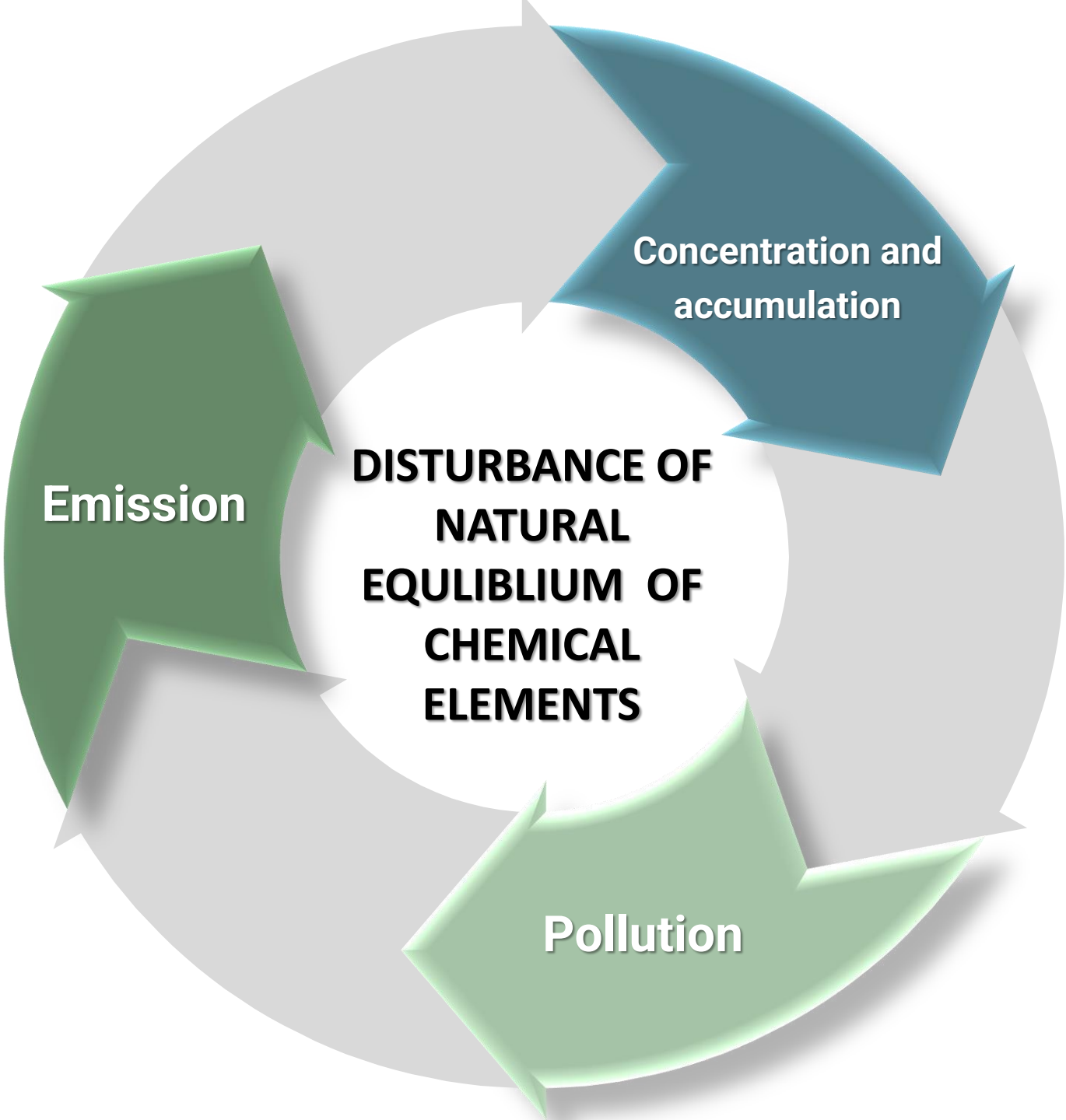
- Air Pollution
- Land degradation
- Deforestation
- Ozone depletion
- Ocean Acidification
- Loss of biodiversity
- Depletion of natural resources
- Climate change. . .

UN Environment (2019) GEO6 Global Environment Outlook, Cambridg University Press, DOI: 10.1017/9781108627146

Natural EQUILIBRIUM of chemical Elements

“

…the distribution of chemical elements in space and time and the combination of factors contributing to such distribution through evolutionary development…


Concentration and accumulation
Pollution
Emission
DISTURBANCE OF NATURAL EQULIBLIUM OF CHEMICAL ELEMENTS

Quality of the environment

Happiness

Freedom and Human rights

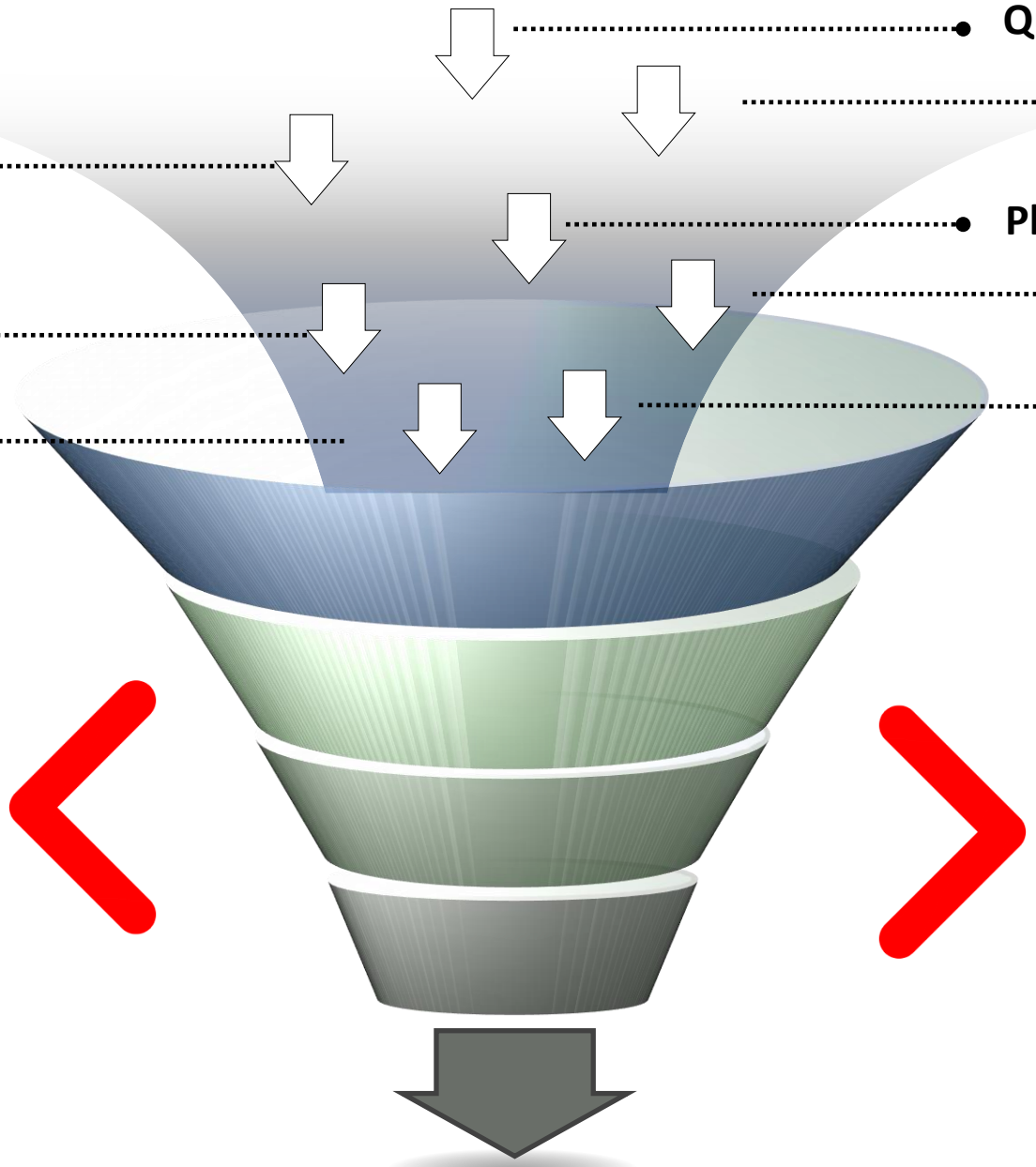
Physical, Mental Health

Education

Recreation and Leisure Time

Wealth and Employment

Built environment

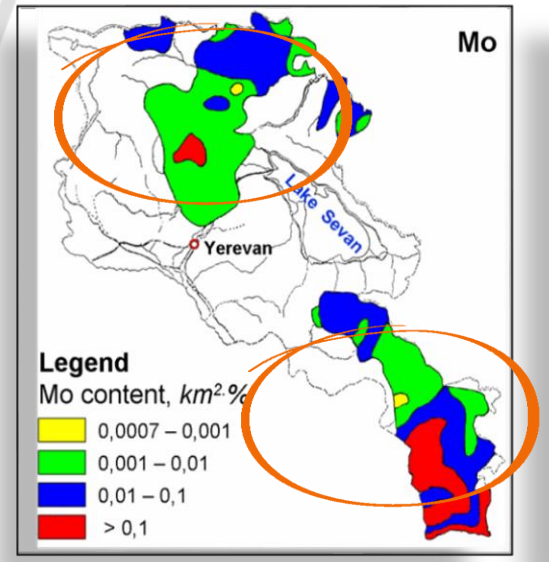


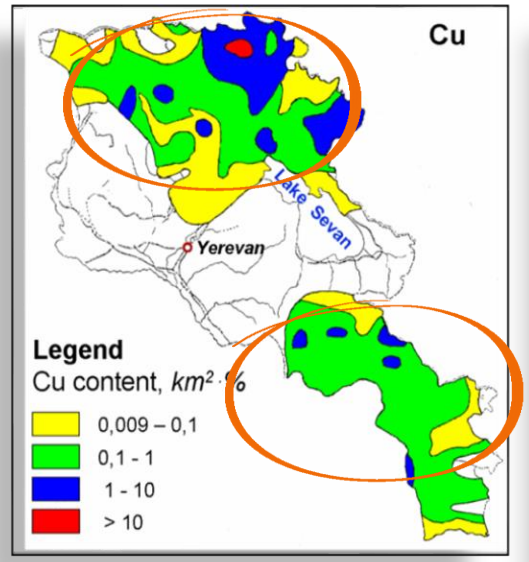
One of the essential characters of the environmental quality is its chemical compassion and geochemical peculiarities.

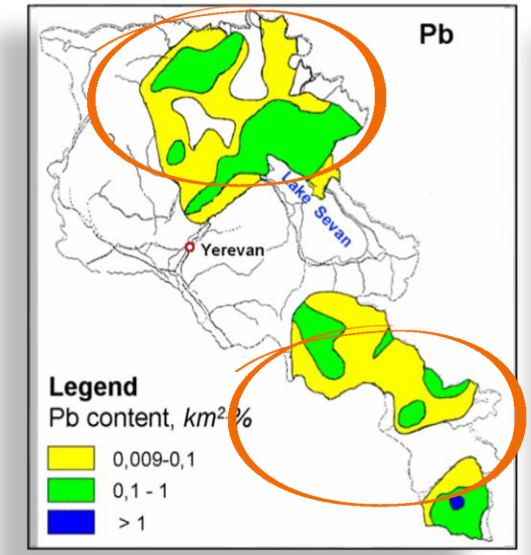
Cycling of chemical elements is fundamental process that control life on our planet

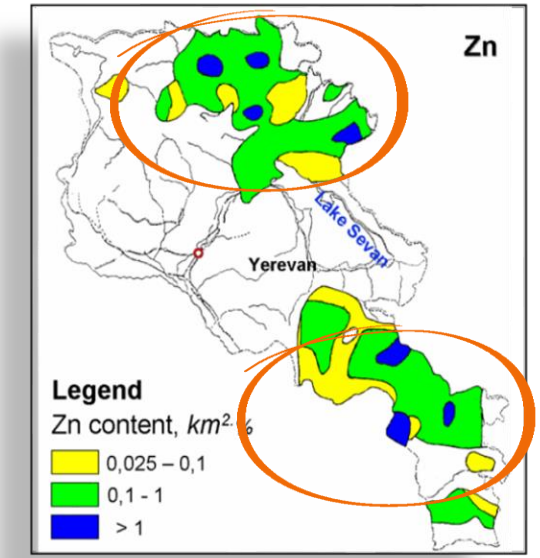
ASSURANCE OF APPROPRIATE QUALITY OF LIFE

SPECIALIZED GEOCHEMICAL SCHEMATIC MAPS OF Cu, Mo, Zn ,Pb CONTENTS ON ARMENIA'S TERRITORY









Source: Saghatelyan, 2004

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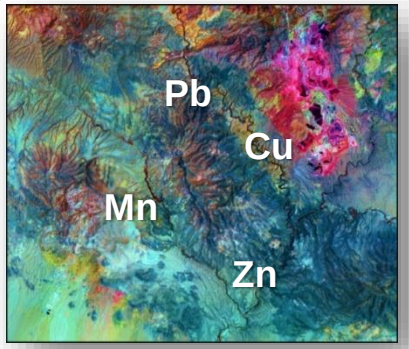
FROM GEOCHEMICAL PECULIARITIES TO HUMAN

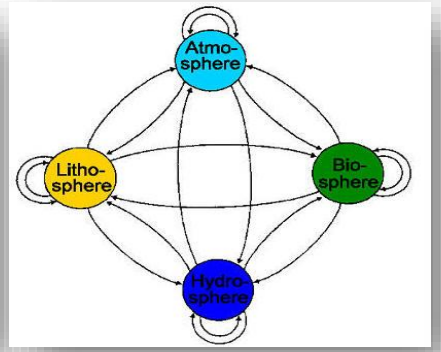
Biogeochemical provinces

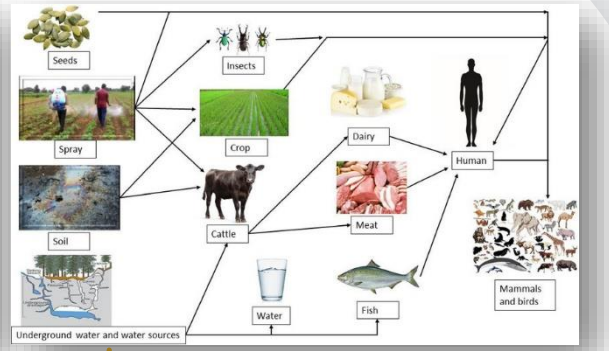
Mining and dressing

Pathways

Food chain





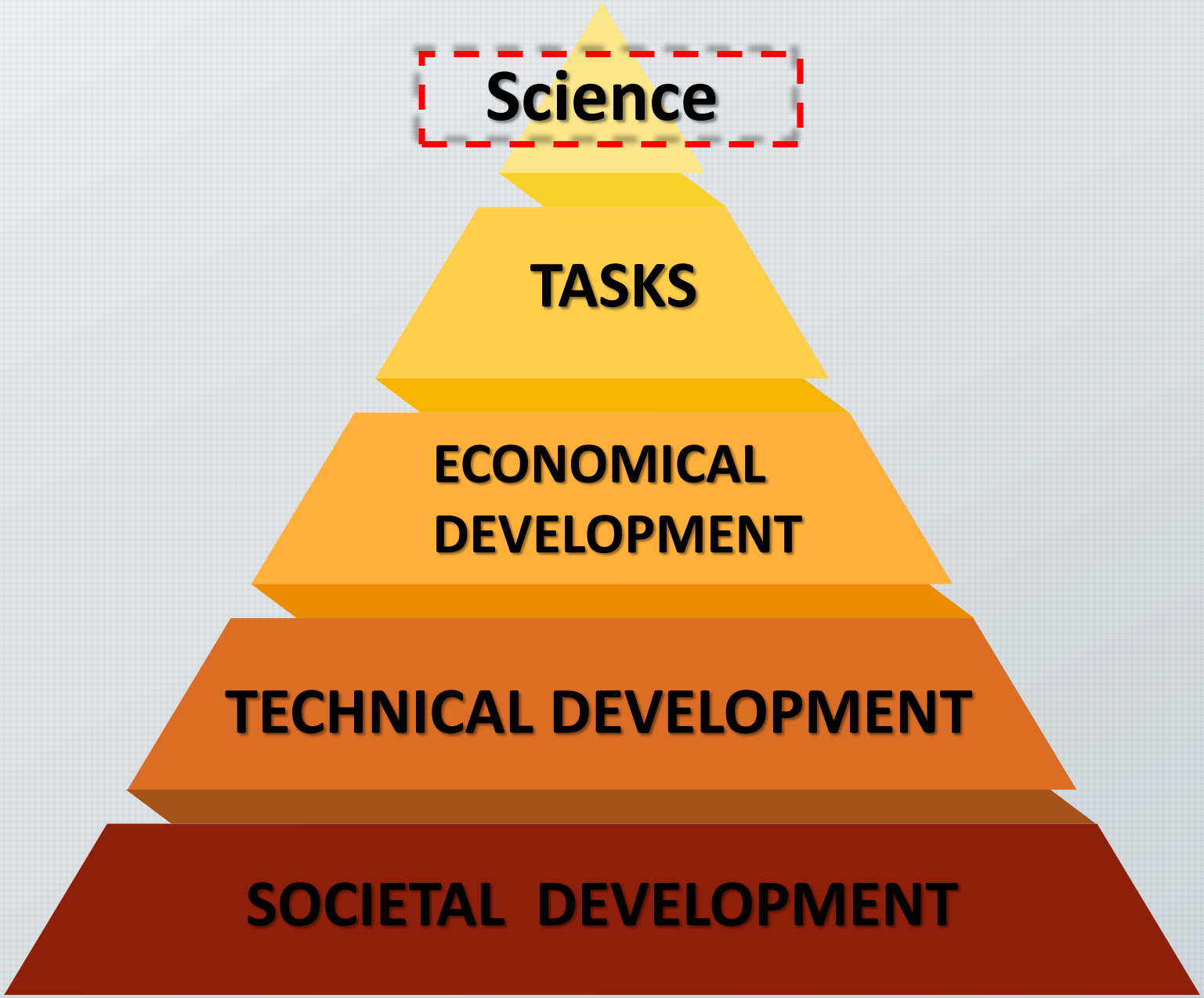


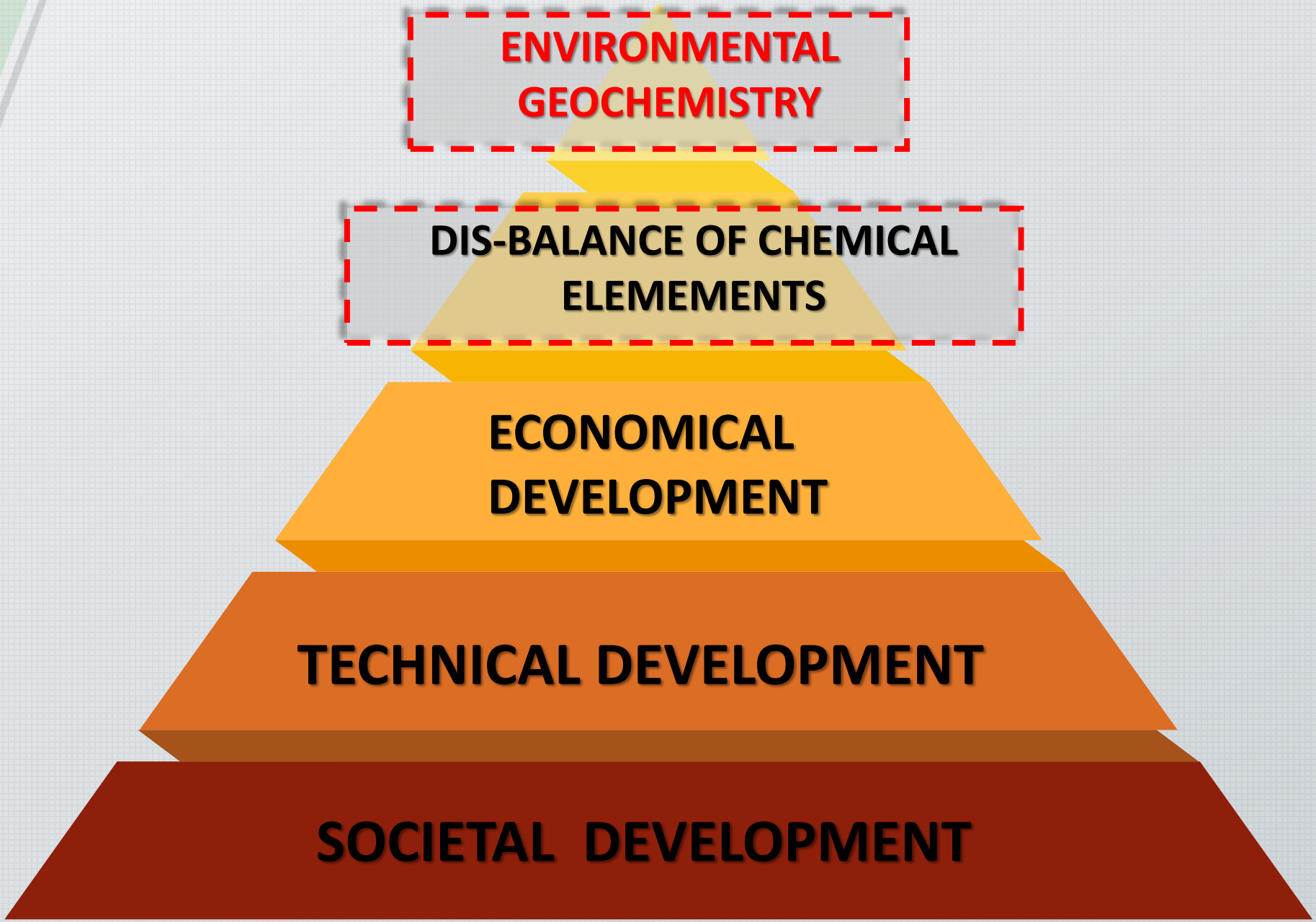
Naturally high in metals

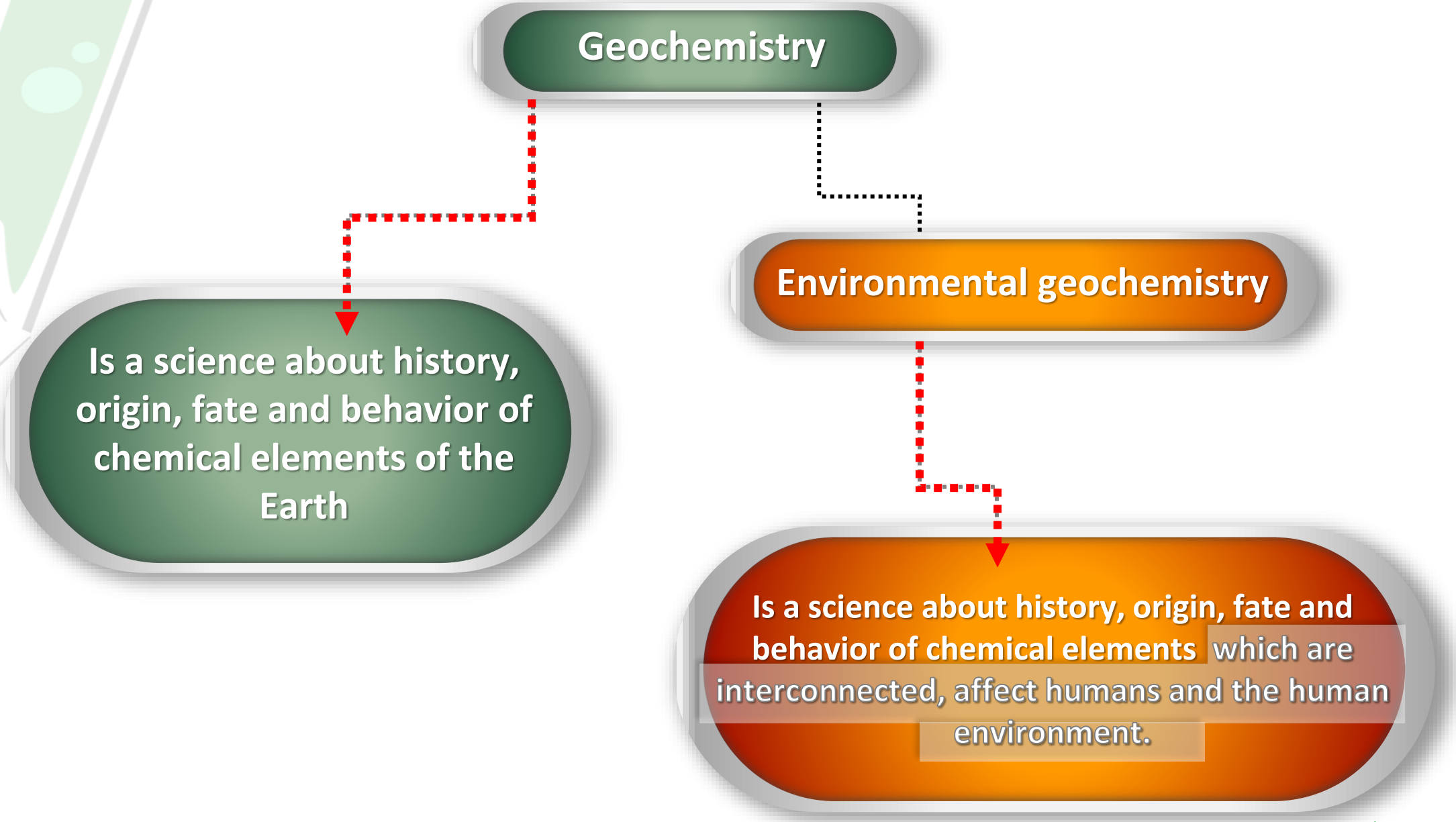
Ore + el. admixtures

Migration, emission accumulation

Health risk


Science
TASKS
ECONOMICAL DEVELOPMENT
TECHNICAL DEVELOPMENT
SOCIETAL DEVELOPMENT


ENVIRONMENTAL GEOCHEMISTRY
DIS-BALANCE OF CHEMICAL ELEMEMENTS
ECONOMICAL DEVELOPMENT
TECHNICAL DEVELOPMENT
SOCIETAL DEVELOPMENT


Geochemistry
Is a science about history, origin, fate and behavior of chemical elements of the Earth
Environmental geochemistry
Is a science about history, origin, fate and behavior of chemical elements which are interconnected, affect humans and the human environment.

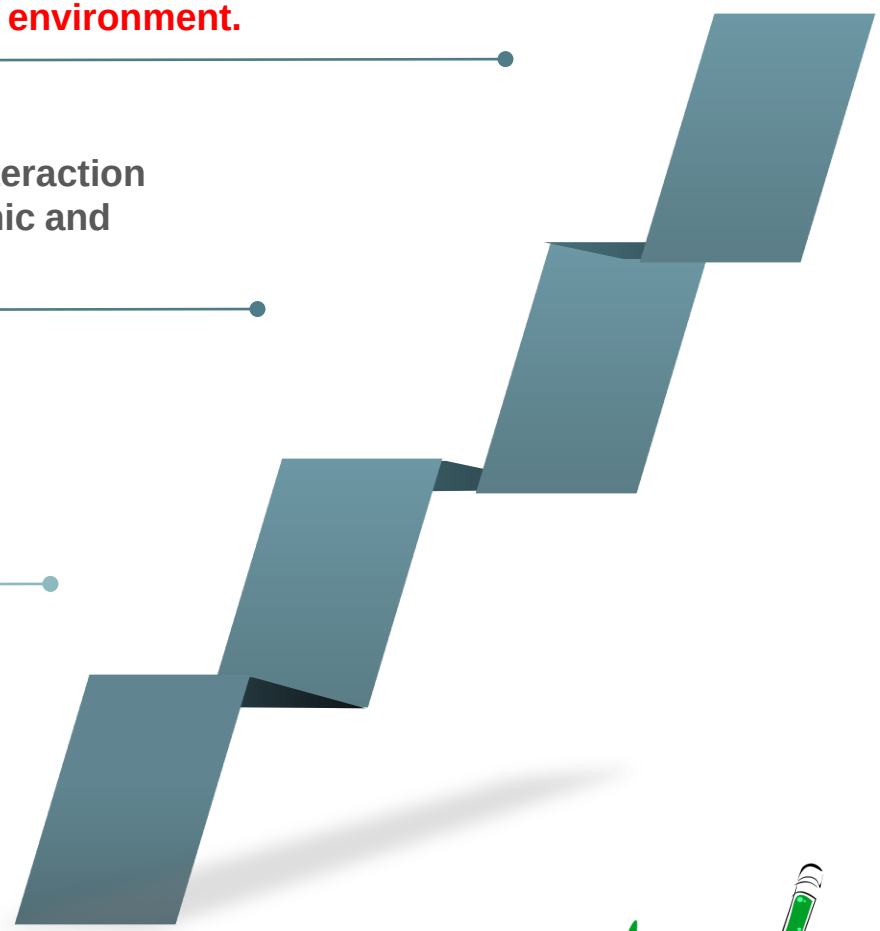
ENVIRONMENTAL GEOCHEMISTRY

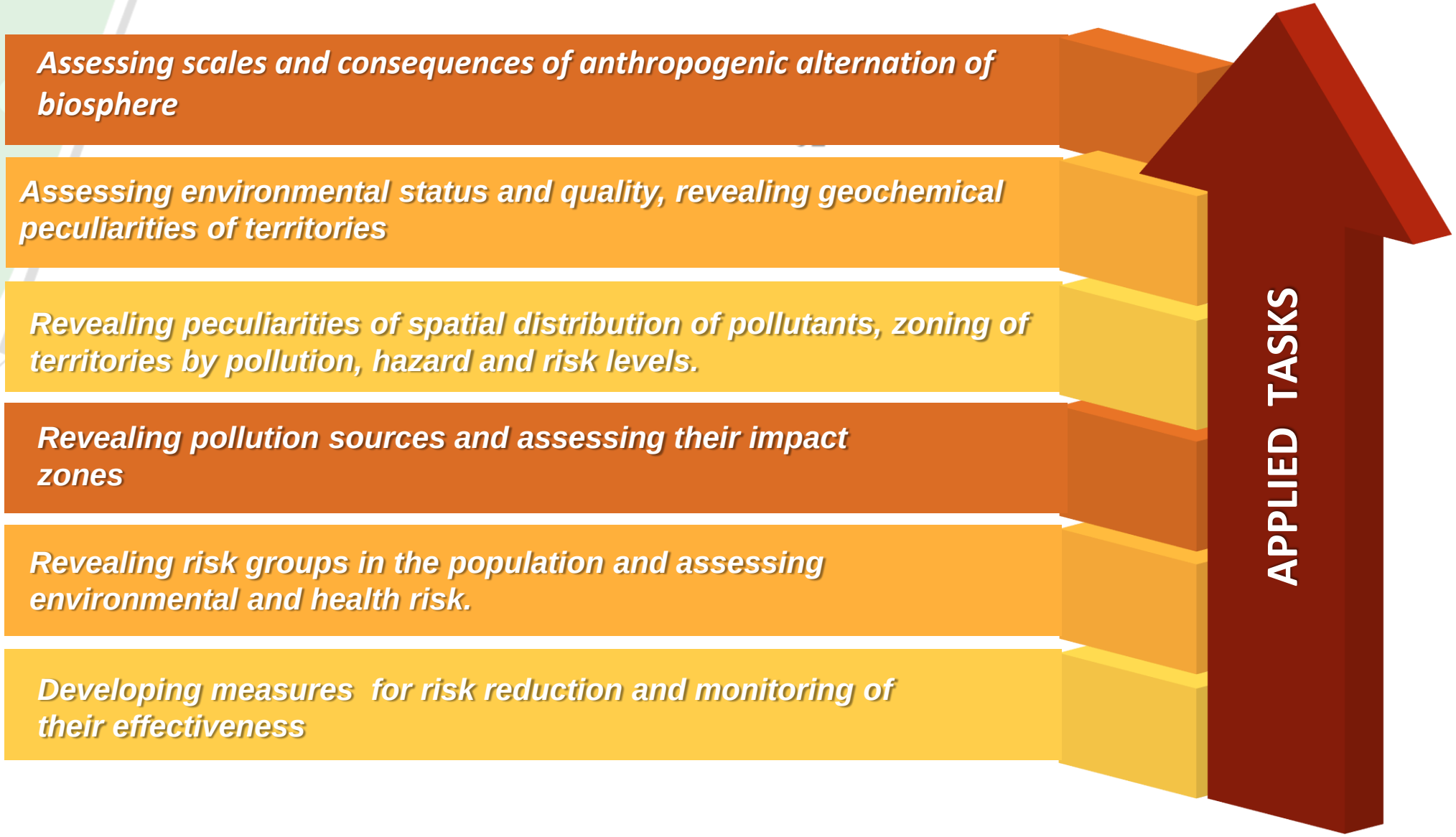
Is a science about history, origin, fate and behavior of chemical elements **which are interconnected, affect humans and the human environment.**

Focus on environment-chemical process interaction conditioned by natural, natural-anthropogenic and anthropogenic factors

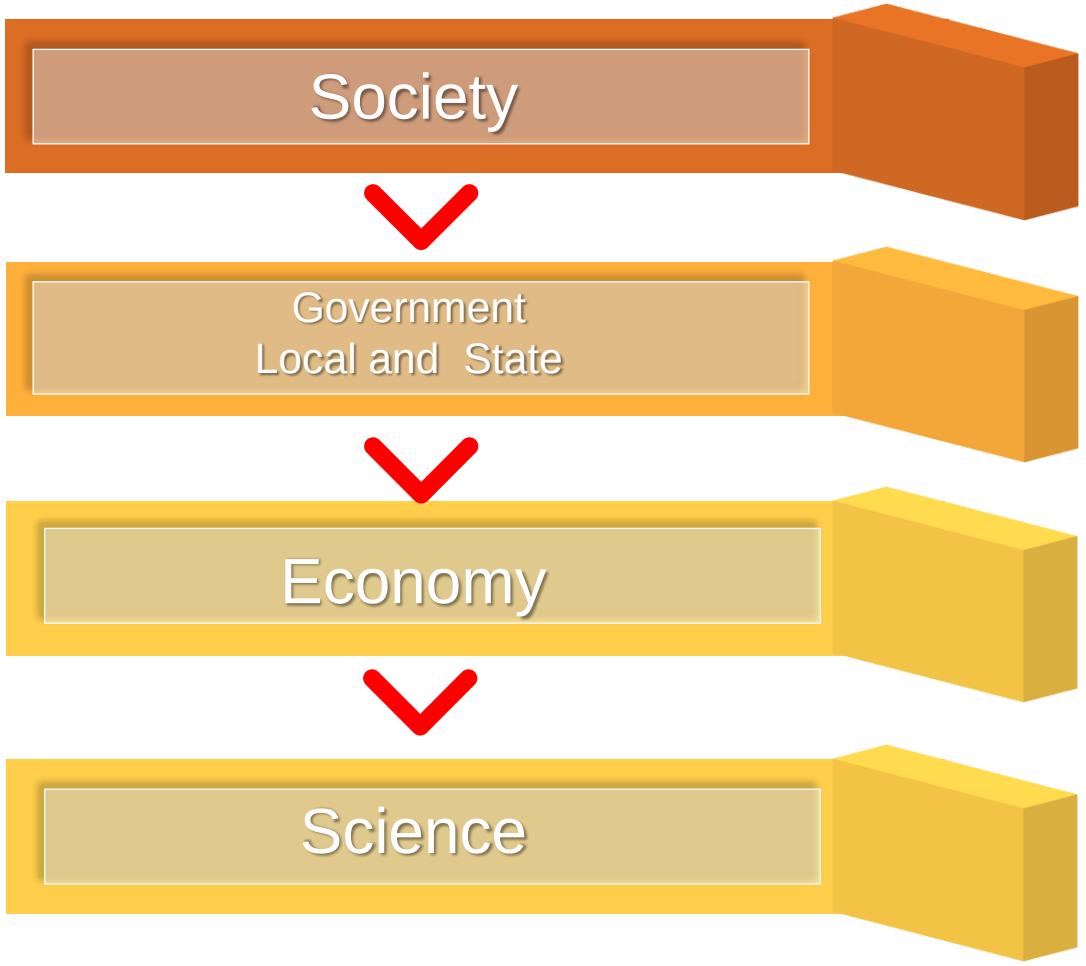
It provides data about environment quality and is essential for cost effective management of environmental quality.

Is deeply involved in environmental quality investigations and monitoring .




Assessing scales and consequences of anthropogenic alternation of biosphere
Assessing environmental status and quality, revealing geochemical peculiarities of territories
Revealing peculiarities of spatial distribution of pollutants, zoning of territories by pollution, hazard and risk levels.
Revealing pollution sources and assessing their impact zones
Revealing risk groups in the population and assessing environmental and health risk.
Developing measures for risk reduction and monitoring of their effectiveness
APPLIED TASKS

WHO NEEDS RESULTS OF ENV. GEOCHEMISTRY INVESTIGATIONS?



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