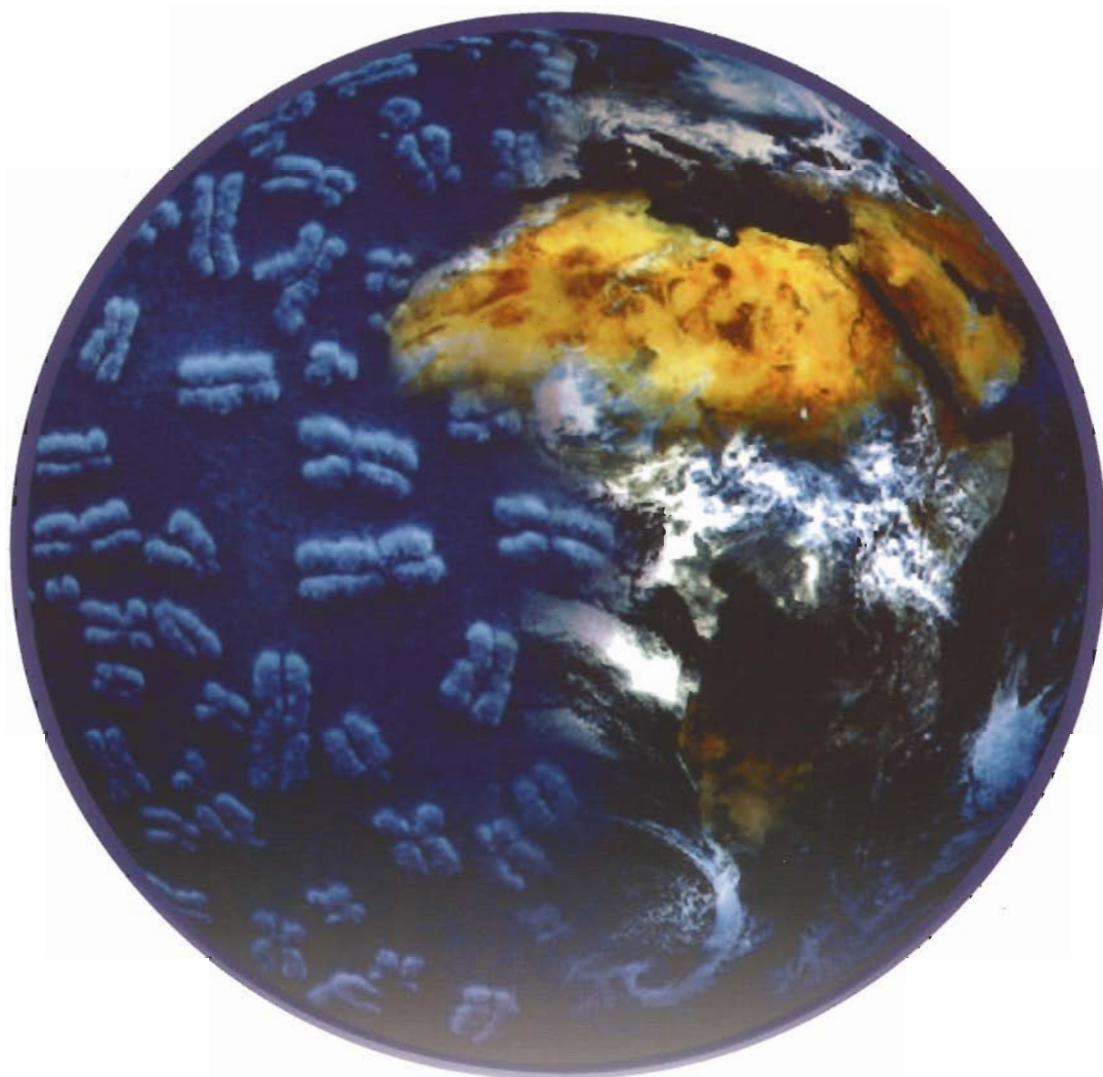




Ministry of Industries and Mines

**Geological Survey of Iran**

**Executive unit of Medical  
Geology Researches**



## Definition of medical geology

Medical geology studies Earth effects on human, animals and plants health. Effects of weather, humidity, temperature and height on human health have been known traditionally. Medical geology has approach relationships with biology, chemistry, physics, mathematics, statistics, agriculture, climatology, mineralogy, immunology, pathology and medical geography. The goal of medical geology is determining geogenic factors and their effects on human health.

Earth crust composed from different elements. Organism's body composed from different elements also. For example 99% of human body's weight composed from oxygen, carbon, hydrogen, nitrogen, calcium and phosphorus. Two groups of elements are necessary for human health. First group includes iron, magnesium, potassium, calcium, zinc, copper, iodine, selenium and fluoride. Second one includes elements that are harmful in very low concentration including cadmium, aluminum, arsenic, lead, and some uranium compounds. These elements have biochemical role in biological processes. Some elements are important for metabolism for example calcium, phosphorus, fluoride and magnesium use in bones structure. Zinc, copper, selenium, manganese and molybdenum are necessary components of enzymes and use in metabolism as iron bearer. Iodine and chromium use in hormone structure. So elements enter to organism's body through soil, water and plants. Considering importance of medical geology, Geological Survey of Iran has established Executive Unit of Medical Geology Researches on 2005/02/28.

## Technical-expertise committees and their duties:

### 1- Geochemistry committee

1-1 Medical geochemical studies of soil and sediment in study areas (thematic, local and regional) for determining qualitative role of different elements on human health

1-2 Study of thin sections and heavy minerals for tracking environmental elements and their origins

1-3 Sampling, field work, processing laboratories data, and determining pollutant areas with geogenic and anthropogenic origins.

1-4 Preparation of medical biogeochemistry reports, determining allowed and desirable limit of pollutants, determining anomaly of environment according available medical standards

1-5 Compilation of latest standards for human health about effects of sediment and soil with different usage considering geological situation of study area

1-6 Preparation of medical geochemistry maps and determining allowed and desirable limit of pollutants

1-7 Using GIS for analysis display and data compilation

1-8 Determining relationships of geological processes that affect distribution of toxic elements and their role on human health

1-9 Compilation of data that result from effective geological factors such as water, soil, sediment, plant and natural radioactive elements and their role on human health

1-10 Translation and compilation of medical geology books, holding scientific relations with other involved countries



## 2- Hydrogeochemistry committee

2-1 Hydrological and hydrogeochemical study on surface and groundwater that use for drinking or agriculture, and quantitative study on different elements and pollutants

2-2 Sampling, field work and systematic sampling of water, determining experiment's method, processing laboratories data, and determining pollutant areas with geogenic and anthropogenic origins

2-3 Preparation of hydrogeochemical maps and quantitative measurement of pollutants

2-4 Gathering scientific reports about water of different areas, translation and compilation of hydrogeochemical and medical geology books



## 3- Natural radionuclides committee

3-1 Determination of high radioactive areas in Iran, radiological control of environment

3-2 Measurement of radioactive absorption by people, radiological research and study on effects of radioactivity on organism health

3-3 Quantitative and qualitative measurement of radioactive elements in ore mineral samples and biologic materials

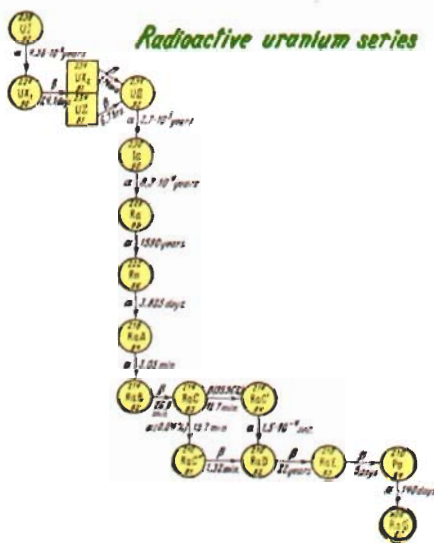
3-4 Test of different materials (water, soil, sediment, plant, organism and minerals) and determining radiological capacity of environment

3-5 Comparison of radio isotopes in water and sediment and measurement of cocentration factor

3-6 Preparation of environmental models for determination of radioactive absorption by people from natural radioactive elements of ecosystem

3-7 Gathering scientific reports about natural radioactive elements, translation and compilation of related books

3-8 Compilation of regional standards for natural radioactive elements considering international standards



## 4- Geobotany committee

4-1 Detail study on soil, determination of mineral's concentration limit and determination of environment anomaly according medical environmental standards

4-2 Comprehensive study on plant diversity in study area including determination of species and sub species, abundant and rare species, and preparation of distribution map

4-3 Herbal sociological study, determination of indicator societies and determination of abundant and rare species

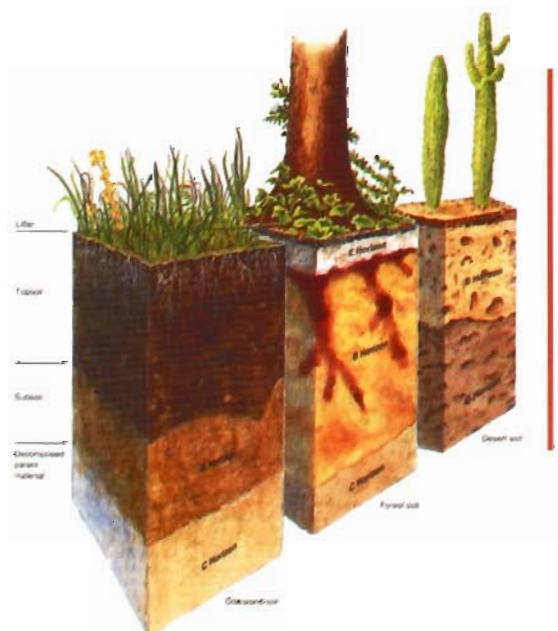
4-4 Autecology study on resistant plants against pollutants considering pedological characteristics such as special elements (such as heavy metals) concentration

4-5 Determining elements concentration in plant's organs, determination of reservoir organs and usage of plant by organism

4-6 Effects of environmental factors on plants morphology

4-7 determination of experiments and standard methods of experiments in each stage and on different parts

4-8 Translation and compilation of related books for medical geology studies in different areas



## 5- Medical committee

5-1 Study on acute and chronic epidemics and determination of diseases

5-2 Study on different factors which cause diseases considering available data ( water, soil, natural radioactive elements and plants)

5-3 Determining Vulnerability of study population (in percent) for presenting statistics report to international research centers

5-4 Preventing geogenic harms using effective methods

5-5 Veterinary study in study area considering medical geology

5-6 Gathering reports about local diseases of different area, archiving them and determination of priorities

5-7 Gathering reports about local diseases

5-8 Translation and compilation of medical books related to epidemiology, toxicology, pathology, medical geography



## Different organization that use medical geology researches

- 1- Ministry of Health and Medical Education
- 2- Ministry of Industries and Mines
- 3- Ministry of Science, Research and Technology
- 4- Ministry of Jihad-e-Agriculture
- 5- Ministry of Energy and related organization such as water organization
- 6- Atomic Energy Organization of Iran
- 7- Department of Environment of Iran
- 8- Institute of Standards and Industrial Research of Iran
- 9- Universities and research centers (Medical sciences, basic sciences, agriculture,...)

## Studies

- 1- Medical geology studies on Tehran map (1:100000 scale) including 7 volume reports.
- 2- Medical geology studies on Semnan, Shahrud, Damghan and Garmsar maps (1:100000 scale).
- 3- Preparing medical geology map of Iran according distribution of geogenic pollutants and their effects on local diseases.
- 4- Preparing medical geology map of Tehran according distribution of natural radioactive elements and geogenic pollutants.

## Future plan

Iran has located in geographical distribution belt of diseases such as goitre, anemia, thalassemia major, and cancer consequently national researches about medical geology are necessary.

According agreements between Executive unit of Medical Geology Researches and Ministry of Health and Medical Education, Atomic Energy Organization of Iran, Water and Waste, Water Engineering Company of Tehran province, Department of Environment of Iran and School of Public Health, Executive unit of Medical Geology Researches will guide thematic and regional researches. This unit will make a conceptual relationship between geogenic pollutants and related disease by regional studies.



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