The Report of the First International Symposium on Medical Geology

Geological Survey of Iran

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Translation, Compilation and Preparation

By

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Preface

Medical geology is a branch of science verifying the impression of geological factors on human health and other living things. By studying the obtained documents from ancient civilizations, it is possible to realize that medical geology is a very old science. However, medical geology as one of the disciplines of geoscience has been re-born during recent years. Today, mutual impressions between human and the Earth have been clarified very well. All available elements in nature have role in the life of living things. Existence of some elements are vital for the health of humans and other living things, whereas, very slight value of certain elements can be harmful and even killer for living things. Within recent decades, applied aspects of medical geology in human health caused to establish an effective relationship between geoscientists and medical scientists throughout the world.

Necessity of medical geology researches in Iran

Due to geological and geographical conditions, Iran is a very suitable environment for diseases outbreak. Development of industrial and mineral activities parallel to urbanization in Iran, and lack of compliance to the environmental standards cause to produce diseases having environmental origin. Availability of documentary statistics regarding diseases, such as fluorosis, arsenocosis, etc. reported from different parts of Iran indicate diversity in Iran’s geology situation, mineral potentials’ distribution, etc. This issue confirms that research implementation in this discipline of geology requires plenty of efforts. Meanwhile, it is important to note that large number of researchers is interested in this field. The Geological Survey of Iran (GSI) as the policy maker and executive authority for geosciences fundamental studies in Iran decided to establish the medical geology department in 2006.

International projects

Parallel to implementation of domestic projects, the Medical Geology Division of the GSI is expanding its international programs in the framework of the GSI contracts. The GSI is the first geological survey in the Middle East that is the member of International Medical Geology Association (IMGA). Iran’s geological survey is the regional representative of the IMGA that is active in the Middle East countries. Besides, the Medical Geology Division has close relationship with the UNESCO (Iran’s branch). Within
the “International Year of Planet Earth (2008)” with the emblem of “Earth and Health”,
the project under the title: the risk of effective geological factors in cancer appearance in
Central Asia esophagus cancer belt was approved by the UNESCO.
The First International Symposium on Medical Geology

The "First International Symposium on Medical Geology" held in the Geological Survey of Iran (GSI) with the cooperation of the Iranian National Committee for UNESCO. The idea for organizing this symposium came from the project of "Studying effective geological risk factors in cancer incidence on the Central Asian esophageal cancer belt" that is collaboration between the GSI and UNESCO in the context of the IGCP partnership project to achieve the following goals:

- Reducing effects of geogenic risk factors on health
- Raising public awareness about impacts of geological factors on health
- Drawing attention of decision-makers to the geosciences as a major effective factor on public health
- Improving society's public health as a major factor in reaching sustainable development
- Cooperating among the geoscientists and medical scientists

Our intention from holding symposium is to provide a qualified platform for presentation of activities in different fields of Medical Geology (Environmental Geology and Human Health). The Symposium is intended for geologists, geochemists, hydrologists, veterinarians, ecologists, chemists, biologists, occupational and environmental scientists, medical professionals, toxicologists, epidemiologists, environmental pathologists, biostatisticians and any other health, environmental and geo-sciences professionals who are interested on Medical Geology issues.

The scientific topics of the symposium are as follows:

- Micronutrients deficiency (selenium, zinc, etc.) and health problems
- Understanding natural and anthropogenic sources, transport and fate of toxic metal ions in the environment
- Environmental geochemistry; determination of trace and toxic elements distribution by geochemical and bio-geochemical mapping
- Potential link between natural radio nuclides and diseases
- Hydrogeochemical studies; toxic elements release and transport mechanisms.
- Geobotany; geological role of the plants (esp. crops) in engagement of elements into food chains
- Role of the geological factors in health problems (human and animals)
- Occupational health and effect of mining activities on human and animal health
- Metal ions in biology and medicine
- Environmental toxicology, ecology and medical geology
- Environmental microbiology
- GIS in human and animal diseases (Preparation of medical geology atlas)
- Natural environmental toxicology
- Natural aerosolic mineral dust and human health
Medical geography; studying diseases epidemiology
Analytical methods for the study of trace elements and toxic metal ions in geological and biological samples
Analytical methods for determining organo-pollutants in soil, water and plant samples
Geo-environmental risk factors in cancer incidence

The first step: Public awareness

Public awareness regarding this symposium was carried out through the following organizations and associations;

1. In foreign countries by:
   - International Medical Geology Association (IMGA); it is an authentic database for medical geology researchers.
   - Iranian Embassies.
   - Geological Surveys of foreign countries.

2. In Iran by:
   - The websites of Geological Survey of Iran (GSI) and the National Geoscience Database of Iran (NGDIR).
   - Iran’s universities websites.
   - Regularly published newspapers

In addition to the above-mentioned methods for public awareness, plenty of brochures and posters were sent to Iran’s universities and research centers.
Supporting to hold the symposium

Since medical geology addresses wide range of researchers from different fields of universities and research centers, plenty of university professors and students announced that they are ready to participate in the symposium. This meeting covered four main subjects, including geochemistry, hydrogeochemistry, natural radioactive elements and geobotany.

From the inception of the symposium activities, the executive committee received considerable international support. Meanwhile, plenty of prominent experts and specialists sent scientific articles and took part in the symposium. Foreign participants were from the following countries;

Republic of Azerbaijan:
1- Farah Valiyeva (Azerbaijan National Academy of Sciences, Geology Institute)
2- Ghamit Hosseinov
3- Jabir Mahmudov

Republic of Tajikistan:
4- Ali Makhmad Sufiev
5- Kabut Vazirov
6- Mirali Tashripov
7- Gul Sharifov

Republic of Armenia:
8- Armen Saghatelyan (Head of Center for Ecological-Noosphere Studies of NAS RA)
9- Olga Belyaeva
10- Hasmik Asmaryan

Republic of Georghia:
11- Shota Adamia (Geo-Ecology, Testing and Assessment Operations – NGO)
12- Alla Zedginidze (Geo-Ecology, Testing and Assessment Operations – NGO)
13- Nino Zakariadze (Geo-Ecology, Testing and Assessment Operations – NGO)
**Islamic Republic of Syria:**

14- Zafer Al Jallad  
15- Ebrahem Al Tahhan

**People’s Republic of China:**

16- Zhang Yinhua  
17- Xiong Luping  
18- Zhon Cunti  
19- Dong

**Republic of Iraq:**

20- Zeki Hassan (Assistant Professor of Mosul university)  
21- Talal Hassan Kadham

**Hashemite Kingdom of Jordan**

22- Yaroup Ajlouni

**The Czech Republic**

23- Bohdan Kribek (Dr.Sc Czech Geological Survey)

**Indonezia**

24- Raharjo Hutamadi
Opening Ceremony

This session was commenced in the Geological Survey of Iran main hall at 9 o’clock of June 14, 2010. Plenty of university professors, researchers plus geology and medicine researchers from ECO member countries, Iraq, China, Czech Republic, certain authorities of Iran’s Ministry of Health and Medical Education, authorities of the UNESCO National Committee, Iran’s Department of Environment, medical research centers, the MAHAK society to support children with cancer, Iran’s Water and Sewage Engineering Company, Iran’s Atomic Energy Organization, Environmental Research Center, Standard and Industrial Research Institute of Iran, Veterinary Medicine Organization of Iran and the Geological Survey of Iran (GSI) took part in the conference. At the beginning of this ceremony, several verses of the Holy Koran were read, and the national anthem of Iran was performed. Then, the authorities and participants presented their speeches, respectively as follows;

• **Statements of Symposium Secretary**
  Eng. F. Rahmani

Ms.Rhamani as the executive authority of medical geology project of the GSI and secretary of the symposium said that medical geology was an interdisciplinary branch of science, comprising certain fields, like biology, chemistry, physics, mathematics, statistics, agriculture, hydrology, meteorology, mineralogy, geology and medical science (toxicology, epidemiology and geographical medicine).

The main objective of these studies is to apply medical geochemistry in determination of anomalies and problems, GIS, samples’ analyses of medical geology environments, data combination with geochemistry and geology databases, and finally understanding the relationship between effective geomorphologic processes in necessary and toxic elements distribution in the environment and various diseases occurrence, report preparation to be presented to health parliamentary authorities for macro-planning and steering programs of Iran.

Similar to other geological surveys in developed countries, the GSI decided to establish medical geology directorate. This division of the GSI intends to implement several national, international, provincial plans and thematic programs in its own projects through
establishment of specialized working groups. The results of these projects will be reported to medical research centers and health and hygiene policy makers in Iran. It is evident that the implementation of interdisciplinary projects requires multi-directional comprehensive collaborations and application of professional services. If such an issue is performed, a considerable step is taken towards macro-objectives of Iran. From the activities inception of medical geology directorate of the GSI, this division decided to establish vast and professional relationship among all related health and hygiene organizations. This connection is either in form of memorandum of understandings (MoUs) or implementation of joint research projects. Several projects are being implemented in this respect, for instance, eight atlases regarding veterinary medical geology were prepared. They are at provincial level verifying the relationship between mineral potentials distribution and mineral resources with zoonotic diseases and cancers. Based on these researches, it will be possible to report their results to the Iran’s medical authorities. Then, these organizations can decide what elements can produce diseases in human beings or animals in a special area of Iran. Two medical geology atlases were prepared on this issue as follows;

1. Mineral potentials distribution and cancers outbreak in Iran and 2. Mineral potentials distribution and zoonotic diseases outbreak. These atlases were designed with high accuracy. Besides, implementation of research projects concerning the Middle East and ECO member countries plus preparation of atlases on medical geology maps are the responsibilities of the Geological Survey of Iran. Meanwhile, the objectives of the first symposium of medical geology are as follows;

- Determination of geogenic and anthropogenic factors in the community health.

- Drawing the attention of Iran’s health policy makers towards geosciences.

- Promotion of applied geosciences position in data exchange to access the newest findings respecting geological and environmental factors on chronic diseases’ occurrences.
• **Statements of Deputy Minister of Industries and Mines and General Director of the Geological Survey of Iran (GSI)**

Eng. M. T. Korehie

In the inaugural session of the symposium, the honorable head of the GSI welcomed the participants from Iran and other countries and emphasized on the significance of medical geology researches and the activities of the GSI in this respect and said, “Medical geology is a new-born field and its first international working group and main reference is the International Medical Geology Association that commenced its work on 24 January 2006. The association started its work with 150 experts from 71 countries. Medical geology is a connecting field among geosciences, medicine and geography. In fact, it produces a link among elements, diseases, geochemistry, contagious and infectious diseases, hydrogeochemistry, mines’ pollution, radiogenics, chronic diseases, geomicrobiology and geobotany.

Due to vast mineral activities, Iran is an appropriate location for radiogenic diseases. Metallogenic belts pass through Iran having probable similarity with diseases’ belt. This issue requires medical geology verifications in this country. The other matters which support medical geology studies for Iran are as follows; geological and geographical conditions of Iran, environmental pollution originating from mineral processing, activities and potentials, development of mineral and industrial activities and also development of urbanization. In addition to these, the risk of chronic diseases occurrences by geochemical anomalies, existence of natural radionuclides in the region and quality control of water resources in Iran are some of the factors that indicate the significance of medical geology studies in Iran. Some of the other medical geology domestic projects which are being implemented by the GSI are as follows;

- Medical geology projects in Golestan, Semnan and Kerman Provinces, geobotany studies in Mazandaran Province.

- Veterinary medical geology studies in Iran (sampling from water and soil resources in animal husbandries of 11 provinces in collaboration with the Veterinary Medicine Organization of Iran).

- Medical geology studies of Tehran on the scale of 1:100,000.
Meanwhile, the following projects have been carried out by the GSI during the recent years;

-Preparation of medical geology and veterinary medical geology atlases for Iran.

-Preparation of medical geology atlas for Chahar Mahal and Bakhtiari Province plus veterinary medical geology atlas for Ardebil and Gilan Provinces.

-Soil geochemistry, surficial waters, groundwaters and radiogenics studies.

The geological surveys which are active in medical geology studies belong to European Union (EU), USA, China and the Center for Disease Control and Prevention of the US. Although the experience period of the GSI in medical geology studies is not as long as these countries, but it could obtain considerable experience in geology and mines exploration. At present, the GSI is executing some joint research projects with Kazakhstan, Turkey, Iraq, Libya, Peru, Venezuela, Colombia and Bolivia. The GSI is the first geological survey in the Middle East accepted by the IMGA, and at present is working as IMGA regional representative. Collaboration development with other related active organizations, and also development of relationships with domestic organizations in form of memorandum of understandings (MoUs) are the future plans of the GSI on medical geology issues. The project respecting effective geological risk factors on cancer occurrence, esophagus cancer belt in the mid-Asia as the UNESCO plans, preparation of medical geology map atlases for the Middle East under the supervision of the Commission for World Geological Maps Preparation, collaboration with Armenia Science Academy, other ECO members geological surveys, and Africa and Latin America countries are the programs of the GSI.”
Dear friends and colleagues,

It is a real honor for me to address you at this International symposium on medical geology organized by the Geological Survey of Iran with the assistance of the Iranian National Committee for UNESCO, Shiraz University, Tehran University, Ministry of Health and Medical Education, Institute of Cancer, Environment Research Center and several other organizations in Iran and also the International Medical Geology Association (IMGA). The idea for organizing this symposium came from the project of “Studying effective geological risk factors in cancer incidence on Central Asian esophageal cancer belt” which is collaboration between the Geological Survey of Iran and UNESCO. This initiative of yours shows the serious interest in the expanding field of medical geology. It is also a pleasure that Iran is one of the most active countries in this initiative and an active member of IMGA. Iran has also a formal chapter within IMGA. Iran is also the first country in the world producing a medical geology atlas. This atlas is an impressive work and has been translated into English and distributed all over the world. We congratulate you on this. Also a veterinary geology atlas has been produced and will now be translated into English also. In recent years, considerable interest has been developed in assessing the risk posed by metals and trace elements in environment quality and human health. It has been recognized for many years that large areas of the globe contain naturally endemic areas related to trace element excess, deficiency, or chronic poisoning. Many of these health related problems have been associated with geological sources (e.g., contaminated drinking water, coal use, volcanic eruptions, dust, etc). For example, the occurrence of endemic goiter (which is the enlargement of thyroid gland) and cretinism has both been associated with iodine deficiency in several areas of the globe including Iran, China, South America and Africa. Selenium deficiency in some parts of China has been related with cases of muscular dystrophy as well as the induction of endemic cardiomyopathy. Excess of fluorine in drinking water has also been associated with endemic dental and skeletal fluorosis in several geographical areas including Iran, China, Africa, Mexico and Chile. Well-documented cases of chronic arsenic poisonings from consumption of contaminated drinking water are known in for example Iran, Taiwan, Chile, Argentina, Mexico, China and West Bengal and Bangladesh. Accordingly, an understanding of the nature and magnitude of environmental and geological sources is a prerequisite for developing approaches in assessing the risk posed by metals and trace elements.
Also other severe health problems are addressed by medical geology. Dust exposures can for example take on global dimension. Ash ejected from volcanic eruptions can travel many times around the world and recent satellite images have shown windblown dust picked up from the Sahara, Gobi and Australian deserts blown halfway around the world. Iran is also one of those regions affected by dust. Exposures to these dusts can cause a wide range of respiratory problems, not only because of the dust itself but also because this dust carries spores of fungus and more than a hundred different types of microorganisms. Other topics addressed are the health problems with the use of Asbestos, and quartz, for example in mining which also is medical geology issues. Radon and natural radioactivity are also important topics for us as well as geophagia, the deliberate eating of soils, very common in Africa but also in other parts of the world.

I have mentioned problems but medical geology also deals with the benefits, it is very important also to remember that nature and geology is the prerequisite for our lives. The nutrients we need come from geology, soils and bedrock, many medicines are from geological products, hot springs are beneficial for our health, our crops and groundwater reflect the geological conditions and therefore also our health.

Moreover understanding the potential environmental and health effects of metals and other elements is of critical importance in order to: 1) ensure that metals are produced, used and disposed of in environmentally sound ways; 2) to minimize exposures to toxic levels of toxic metals and metal species. Furthermore, because the potential environmental and health hazards of metals are strongly dependent on different physical and chemical forms (i.e., modes of occurrence), a sound evaluation of metal "speciation" is needed to evaluate the situation in which potential adverse effect can occur.

The role of this symposium in increasing the science of medical geology in the Middle East is very substantial. I have mentioned some of the topics of medical geology and several of these are very important for Iran and neighboring countries, for example dust storms, arsenic, fluorosis, natural radiation. All these, together with several other issues are important areas of research in Iran.

One important step in addressing these matters is this symposium. Reputed scientists from various organizations are participating.

I also want to say that you are welcome to actively use our much visited website of IMGA www.medicalgeology.org. If you wish to publish information on this site you are much welcome to do so. Just send me material and I will arrange it.

Our sincere greetings to you all and we wish you success with your important symposium and I am sorry that it was not possible for me to attend. However I hope to meet you some other time in Iran.
Dr. Gazani in her speech announced, “Cancer belt verification in the region indicates that cancer occurrence commences from a region in Turkey and then reaches an area in Bangladesh. This situation is due to presence of arsenic in these areas. Considering that certain rocks and minerals having arsenic have been found in the region and some waters of this area are radiogenic, cancer belt follows tectonic belt trend and cause to produce pollution and diseases in the region.” She added, “The international program for geosciences was established by the national committee in Iran in 1987. It assisted to develop geological researches in Iran and established collaboration with domestic and international programs. It also produced conformity among geoscience researches in this country and made a harmony with international plans.” The head of geosciences committee said, “This committee is one of the 13 professional committees affiliated to the UNESCO national committee in Iran. Meanwhile, as drinking water, agriculture, nutrition, meteorology and related issues to climatology are important matters, they are verified in this symposium.”
Dr. Malekzadeh about the outbreak of certain cancers in the northern part of Iran said, "They are the result of geological and environmental factors." He also added, "50% of cancers of Iran belong to the digestive system, and among them the stomach cancer is the most common indicating the rate of 20%. 100 persons are daily died by cancer in Iran. Out of mentioned figure, 22 persons die by stomach cancer. 10,000 persons annually catch stomach cancer, and 8000 of them die. Iran is one of the countries that indicate high rate of cancer outbreak. Stomach cancer is the most common in Azarbaijan and particularly in Ardebil Provinces. This type of cancer rate reduces towards southern parts of the country and increases towards northern countries, like Azarbaijan and Russia. The cancer outbreak is higher in mountainous areas of countries like Colombia and Costa Rica, but whatever we move towards beaches, this rate decreases in those countries. It must be clarified that the reason of this issue is due to geological and environmental factors or it is because of human being genes in the mentioned area. The outbreak of stomach cancer in the US was similar to Iran in 100 years ago. But today this rate decreased and reached 2% to 3%. Lung cancer indicates an increment trend in the US. It is important to that human genome does not change a lot within 100 years, therefore, this issue must be the result of environmental factors. Esophagus cancer belt is from northern parts Iran towards northern China. Esophagus cancer rate indicates four different percentages for the following parts of Iran; 45 in one hundred thousand in Golestan Province, 20 in one hundred thousand in Ardebil Province, less than 10 in one hundred thousand in Fars and Kerman Provinces. Studies carried out in different regions of Iran indicate that the cancer rate is high in Gonbad-e-Kavoos, and it is because of high values of nitrate in foods of this area. At present, 2000 patients having cancer are under experiments. If the genes producing this disease are verified, these researches can indicate their results within long-term and probably within next 10 years."
• **Presentation of “the Earth and Life” movie**

The objectives of short movie presentation under the title of the Earth and Life were introduction of medical geology discipline and related issues, capabilities of the GSI in this respect and public awareness regarding carried out works in the GSI. To provide this movie several trips were done to different parts of Iran. For instance, Deh Sheer in Yazd Province, Gonbad-e-Kavoos City and neighboring villages in Golestan Province, Ramsar and neighboring villages, Alamoot Valley in Qazvin Province and Qorveh surrounding rural areas were some of these locations. Photography, preparing reports and also several interviews were carried out in these trips. Meanwhile, a movie is prepared from supporting center for children suffering from cancer. In this movie, impressive scenes of emotional and sympathetic issues next to the field and laboratory work matters provide a suitable environment for connection between the movie content and spectators. In the meanwhile, fully equipped laboratories of the GSI were exhibited in the movie. The film wants to express a problem, and has an interrogative nature. In fact, the movie intends to indicate how geological phenomena affect on the health of human beings, animals and plants, how it is possible to realize their negative effects and how they can be prevented. Since medical geology is new discipline, and most people and experts are not aware of its aims, it seemed that public awareness is a must in this respect. Movies are powerful and capable tools in transference of considerable amount of data to their observers. Considering the attractiveness of movie-making industry, it is possible to attract more spectators.
Dr. H. Jabbari’s speech was about “Public Health and Medical Geology”. He described this subject as follows: “Today, when we speak about public health, it means that the health of whole community is targeted. In fact, the science of public health is equal to the health of whole people of community. Public health verification covers wide range of subjects for instance;

- Life quality verification: Access to clean and healthy air and water plus suitable nutrition.
- Knowledge promotion and public awareness about hygienic criteria.
- Social health comprising access to hygienic facilities, jobs, education and training, accommodation, etc.
- Verification of infectious and contagious diseases, like AIDS, malaria, tuberculosis, etc.
- Verification of climatic changes verification on public health.

Therefore, it is possible to say public health is important from following point of views;

- Access to sustainable development.
- Healthy community.
- Access to appropriate life quality.
- Access to science and technology.
- Access to healthy environment.”

In the second part of his speech, he defined the available problems in medical geology and said, “Medical geology is a science that verify the impressions of natural environmental factors on living things’ health. The origin of these environmental factors (negative or positive) can be from inside the Earth, Earth surface or air. Some of the medical disciplines which have the maximum application in medical geology are as follows;

- Chronobiology: This branch of science verifies the impression of temporal and alternate changes on living things. Verification of light rhythmic changes within 24 hours is a good example for this purpose. These changes (their intensity and duration) highly depend on environmental and geographical conditions.

- Balneology: The study of hot water springs therapeutic properties (geothermal resources).
-Nutrition: The survival of human beings and other living things depends on their nutrition. These creatures supply their required nutritional materials through consumption of herbs and animals. The source of all materials in foods originates from soil, the outmost layer of the Earth.

-Bioclimatology: Verification of atmospheric factors, like temperature, sedimentation, wind, humidity, etc., on human beings and other living things.

In fact, medical geology is an interdisciplinary science that research in its area requires collaboration with scientists of different fields.”
The title of Dr.Modabberi’s speech was “Medical geology and environment”. In his speech, he said, “Environment is network that different factors, such as hydrosphere, atmosphere, biosphere and geosphere indicate interactions with each other. From the creation date of the Earth, the two most impressive events on it are as follows;

- Appearance of blue-green algae in Proterozoic which changed the atmosphere of the Earth. They changed the reduction conditions to an oxidizing environment.

- The creation of human being on the Earth.

We intend to introduce some of the most important environmental problems plus their risks and hazards to the audience. Contact with organic and mineral chemical compounds available in foods is a dangerous issue for the human being. These pollutions originate from natural resources. For instance, arsenic in water resources of Bangladesh is a natural pollution.

Meanwhile, toxic elements can enter the environment by anthropogenic (produced by human beings) sources. Pesticides releasing through farming activities is one of the prominent examples of this matter. Researches indicate that some of the industrial compounds act like hormones in the human body. Children are the most susceptible group to pollutants. For instance, children’s milk bottle was made of plastics having BPA. Today, study on hazardous chemical compounds to environment has a clear position in the world’s scientific studies and draw attention of international scientific organizations. Asbestos is one of the most hazardous compounds for human health. Based on the obtained statistics, about 125
million people throughout the world are subject to this mineral in their working environment. 107000 persons suffered from lung cancer originating from contact with asbestos in their working environment. Benzene, cadmium, dioxins, lack or excess of fluorine, lead, mercury, hazardous pesticides and plastics are hazardous compounds to the environment.

One of the most important problems that most countries of the world are involved with them is water resources pollution. Based on collected statistics, one billion persons deprived from hygienic drinking water. This crisis becomes more obvious when we realize 1.8 million persons were killed by polluted waters. Most of these deaths are the result of diarrhea. Today, air pollution becomes one of the most important environmental crises. About 3% of the world diseases indicate direct relationship with air pollution. Urban air pollution is the result of traffic, industrial centers and energy producer location. These types of air pollution kill 800,000 persons, annually. Malaria kills 1.2 million persons in the world annually. African children under the age of 6 are the most common victims. It seems that unsuitable water, incorrect waste disposals, destruction of forests, and species extinction are the most important agents in spreading diseases originating from insects, like, malaria, Dengue fever and leishmaniasis. Diseases produced by lead contact kills 230,000 persons, annually. It has destructive impact on one third of world children population. More than 97% of these children are living in developing countries. One of the most important factors directly and sometimes indirectly affect on human health is climate change at global scale. These changes are effective on diseases distribution pattern. They also affect on agricultural product pattern and kills more than 150,000 persons.” At the end, it is important to mention, “Poisoning kills about 355,000 persons in the world, annually. Two third of these victims are living in developing countries. The causes of their deaths are toxic compounds and pesticides available in their working and living environment.”
• **Statements of General Director of Mahak Research Center**

Eng. A. Ahmadian

In this speech Eng. Ahmadian announced the objectives and activities of MAHAK Institute as follows;

“MAHAK is an organization that its superior aim is to help human being and children suffering from cancer in Iran and other countries. It made considerable research into welfare issues. Supporting children suffering from cancer and their families, their treatment based on patients’ rights law, understanding cancer causes, the most appropriate methods for cancer prevention and treatment, diagnostic methods and the best and newest treatment methods are missions of MAHAK organization. It is a welfare, private, non-political and non-governmental organization. It works based on public participations in form of cash and other supports (goods, services and technology, etc.). Its employees and other volunteers work together to reach its superior and philanthropic assistances. MAHAK not only assists children suffering from cancer, but also encourage the superior philanthropic thoughts. Clarity, making confidence and answering the needs are the most prominent properties of this organization.” Eng. Ahmadian also added:” the MAHAK commencement date, more details on its establishment history and mentioned its financial and intellectual supporters. In brief, the results of MAHAK activities and researches are as follows;

- Bilateral research collaboration contract with Iran Cancer Institute (26 October 2004).
- Research collaboration convention with Russian Gustav Institute in France (March 2005).
  - Research collaboration convention with Rooyan Research Center (2007).
  - Research collaboration convention with Avicenna Research Center (2009).
MAHAK is a strong supporter for parents whose children suffering from cancer. With this efficient support, parents can only think about treatment of their kids and children wishes from to be or not to be can convert into better tolerance of treatment process and life quality. No kid dies by poverty or incapability to pay treatment and medical expenses. MAHAK presents the clearest services and is an appropriate index to evaluate the philanthropic services of other similar organizations at national and international level. Since the services of this organization covers various aspects is unique in the world and is in the top 10 levels in each of its services.”
The title of Dr. Yaghubpur's speech was “The impact of charcoal particles originating from volcanoes on human health”. He said, “Medical geology studies the impacts of geological factors on living things (including human beings, animals and plants). One of the geological factors that have close relationship with the life of human being is minerals. Some of these minerals are useful for the human health but some of the others are harmful. One of these minerals that its role in human health was studied is coal. This mineral was used by human beings from ancient times. Although coal had significant role in human beings civilization, it has harmful effects on eyes. The outbreak of respiratory diseases among the coal mine workers has been proved since many years ago. Exploration activities scatter small particles of this mineral in the air that mine workers breathe. These particles enter the workers’ lungs and deposit in their air sacs (alveoli). This situation will reduce the lung volume in long term and produce difficulty in oxygen exchange through lungs. During the autopsy of mine workers who died by respiratory disease, it become clear their lungs are completely black. Therefore, the term of “Black lung” disease originated from this situation. In addition to coal deposits, volcanic eruptions scatter large amount of these particles into the air. Since the mentioned particles are very light, they can be transported to very long distances by wind. Researches indicate that sometimes, particles originating from a volcano in a continent have been seen in another continent. This continent may be hundreds of kilometers away from the other. These particles enter the lung of humans and produce conditions very similar to the lungs of mine workers. Therefore, the outbreak of respiratory diseases is very common among residents who live close to the volcanoes.
The afternoon session of the first day of symposium was allocated to special scientific speeches. Most of the speeches of this part were research projects of medical geology division and are in form of memorandum of understanding with universities, organizations and research centers. Some of these speeches are as follows;

- **Medical Geology Project of Golestan Province, Iran**  
  *Presented by Dr. F. Moore; scientific advisor of Medical Geology Project and the faculty member of Shiraz University.*

The speech of Dr. Mor, the advisor of the national project for esophagus cancer in Golestan Province is as follows; “Medical geology verifies the geogenic (materials and chemical compounds available inside the Earth) and anthropogenic agents (for example, mineral and industrial activities may cause cancer and other diseases. The reason for Golestan Province selection for this study is the vast outbreak of esophagus cancer in this region in comparison to other parts of the world. This project is performed by a scientific team by Shiraz University. Carcinogenic conditions are in relation to hazardous and risk factors. It may not be possible to reckon only one single agent for cancer occurrence. Many factors are involved in the appearance of this disease. The results of researches are analyzed in statistical
verifications and risk parameters. The thing that can be useful in these researches is the study of biogeochemistry cycle. This cycle commenced by collection of elements in the biosphere about 4.6 billion years ago. No elements could enter or exit this cycle. In fact, elements just move inside it. In this project, the main aim is based on biogeochemistry. In this cycle the path of elements movement from rocks to water and soil and sediments is clarified. This investigation is to understand what effects, the elements enter the food chain of human being have on disease occurrence. In the executive stages of this project, Golestan Province divided into different environments, and studies stages are as follows;

1. Sampling stage: to realize toxic elements distribution and micro-nutritionals in Golestan Province geochemical and hydrogeochemical systematic samplings were carried out respecting following environmental factors.

- Water resources (surficial waters, groundwater, agricultural and mineral waters).
- Soils (urban and agricultural soils).
- Waterway sediments.
- Herbal samples (agriculture and garden products, livestock food).

After preparation, collected samples were sent to reference labs in Iran and overseas for elements analysis and determination of organic compounds. After statistical processing, samples' analyses data were compared with international standards (WHO & EPA). Then, geochemical and hydrogeochemical maps of the region were prepared. Some of the results of these researches were new, some of them refused the previous researches and the rest were certified the former outcomes. In the taken soil and sediment samples, certain minerals, such as silica and zirconium were observed. These factors can scratch esophagus tissue and prepare the conditions for cancer occurrence. Chemical analysis of sediments and cereals indicates high values of elements that can have role in cancer appearance. It is important to note that sometimes deficiency of elements can be carcinogenic. At the first step, statistical data were collected, but the analysis of data relationship and which data have more important role in cancer occurrence require various statistical models. Unfortunately, lack of correct statistics or availability of incorrect statistics produces difficult conditions in data analysis. Finally, it is important to say that determination of hazardous agents producing diseases require years of research and collaboration of many specialists from different fields.
Anthrax is one of the infectious diseases of mainly herbivorous animals which can easily transfer to human and is a significant risk for human health and economic losses due to death of food animals. Bacillus Anthracis is a Gram positive, non motile and spore forming bacteria. It exists in vegetative and spore form and death is due to septicemia. Anthrax can affect all the mammals but the degree of sensitivity is different in different species. Birds are naturally resistance against the disease. Human is less sensitive to disease but can be affected in any age. In most cases it can be treated by penicillin but usually anthrax is lethal especially in pulmonary or meningitis forms. It is supposed that anthrax geographically is originated from Africa.

In the aerobic condition with the temperature between 15-40°C, anthrax develops to spore, which is the resistant form of the disease in the environment and can remain alive for many years. Spores are covered by a protein complex coverage and believed that can remain in the soil up to 40 years. Vegetative form of the disease is not resistant outside the body of the host. The spores in the soil remain alive from a season to other and can cause disease in the animals which feed on the infected pastures. The main route of disease transmission in animals is orally by ingestion of infected food and water, although skin form of the disease is common in human and respiratory form can happen which is very dangerous and lethal. Anthrax is endemic in tropical and subtropical areas like Iran and its occurrence rate depends mainly on the type of soil and climate.

Soil is the main source of bacteria spore, but spores can be found on the hair, wool and all the parts of the deaths. How the spore can remain alive in the soil for many years and the biocycle of bacteria in the soil in not well known. It is believed that minerals like Calcium have main role in protecting the spores and to some extend magnesium.
In this study we tried to analyze the soil of the different provinces of the Iran regarding the amount of different minerals and compare them to the number of outbreaks of disease in each province to find if there are other minerals effective in protecting and keeping the biocycle of anthrax in the soil.

**Material and methods:** 20 soil samples are collected randomly from some of the provinces (Ardabil, West Azarbaijan, Khuzestan, Bushehr, Chaharmahal, Golestan, Kohkylouyeh, Kerman, East Azarbaijan. Samples are collected from surface to the 30 centimeters deep. The soil mixed well and 500 g is packed and sent to geology organization for analysis of minerals. Results are expressed in ppm. The average amount of samples for each province is calculated and compared to the number of disease outbreaks in the related province. Outbreaks regularly reports by Geographical information system (GIS) of Iran veterinary Organization.

**Results:** Results of the analysis and the comparison between soil minerals and outbreaks are shown in following figures. Each figure is entitled by a mineral name which is compared to the outbreaks. Number of outbreaks is shown in red and amount of mineral in blue color.

As it is appeared in the figures the pattern of diseases occurrence relating to Calcium and Actinium seems to be the same. Cobalt shows a different pattern only in Khuzestan in comparison to other provinces. For Cerium pattern of mineral looks like disease occurrence. Except that in Bushehr no cases occurred. Regarding Khuzestan, the effect of Chrome may be because of chance because the pattern of occurring the disease and mineral are the same except that the expected value for occurring the disease is very low. In the case of cupper the occurrence of disease seems to be compatible with the amount of cupper although in Khuzestan the pattern is somehow different. For Gallium the pattern is like Calcium and Actinium except again for Khuzestan.in the case of Lanthanum, Lithium, Nickel, Plumb, Rubidium, Zing and Zirconium the pattern of disease occurrence seem to be compatible with the amount of mineral in the soil.

**Discussion:** Anthrax is the most important zoonotic disease and bioterroristic biomaterial because of the resistance of its spore against the different climatic conditions. Spore of anthrax can remain alive in the soil for long times. Some of the scientist believe that in the absence of the suitable host, the spore can remain in the soil and vegetate in such a way that can keep safe its biocycle. It means that the spore in the soil will change to vegetative form and replicate, then again will develop spore and this cycle will continue for many years.

Without any doubt, the composition of the soil has a very important role in persistent of spore and if the favorite conditions such as necessary minerals, temperature, humidity, and ... exist, spore can remain alive in the soil for many years and keeps its pathogenicity. Therefore with the collaboration of the medical geology department of geology organization of I.R.Iran, this study conducted to show the probable role of the other minerals, except Calcium which its effect has been shown earlier, in persistent of anthrax spore in the soil. It has been shown that some minerals other than Calcium may have effect in persistent of spore. The figures show that minerals like actinium, cobalt, cerium, chrome, cupper, gallium, lanthanum, lithium, nickel, rubidium, plumb, zing and zirconium may have positive effect on the spore persistent like Calcium however minerals like plumb, gallium, have the
same pattern as Calcium and minerals like lanthanum, lithium, nickel and rubidium may have a very significant role.

In some of the provinces the amount of the mineral does not show any relation to the outbreaks: For example in khuzestan. This may be because of the insufficient number of samples or misdiagnosis of anthrax with other diseases and lack of sufficient verification of the reported outbreaks of anthrax which led to report anthrax rather than other diseases. We need to continue our work in greater scales regarding soil, water, feed analysis and compare the results with free and affected provinces to be able to show the exact reason of persistent and reoccurrence of the anthrax in some of them.
• Medical Applications of Bentonite

Dr. Rajabov, (General Director of Geological Research Center, Sciences Academy of Tajikistan)

Bentonite, which are the clay mineral formation of montmorillonite composition, are known to specialists in the late XIX century, when they were first discovered among the Cretaceous Fort Benton, Wyoming (USA). They were named on their place of first discovery. In the geological literature, based on the fact that they are finely dispersed clay rocks, consisting mainly of montmorillonite mineral, often referred to as bentonite and (or) montmorillonite clay. However, also found that bentonite clays show a high hydrophilicity, so that they have their characteristic absorption, swell, binder, gelling, the ion exchange and other properties, the degree of manifestation of which depends on the quantification of rock-forming minerals-montmorillonite. Due to these special properties, bentonite (montmorillonite) clays are widely used in many industries (casting, oil, wine, oil and gas, construction, porcelain, rubber, paint, textile, etc.) and agriculture (livestock, crop).

With regard to medicine, its therapeutic treatment-and-preventive sphere, bentonite (montmorillonite) clays were introduced in the early 40-ies in the Soviet Union. The pioneers in this case were Georgian medical scientists, who were the first for the treatment of burn wounds using paste-like mixture made from bentonite Askanskogo field. The resulting mixture of bentonite and water, called "askankollom" with the addition of a streptocide with sulfatsilom and streptocide with tannin serves as the basis for the preparation of various ointments. Such ointments after clinical trials since the early 50's have been widely used for medicinal purposes. In particular, "askankoll" with 5% salicylic acid, acquired the property is well absorbed and the ointment of this composition showed high effectiveness in the treatment of purulent wounds. A streptocid ointment which was prepared from askankolla showed effectiveness in the treatment of various forms of dermatitis. Almost during the same years of work on the use of bentonite clays in medicine began in Uzbekistan. On the basis of numerous experiments in 1951 conducted the first pilot tests Azkamar bentonite deposit for the treatment of skin diseases. In the course of these studies found that the investigated bentonites which are characterized by high ion-exchange properties, heal even allergen (eczema squamosum) skin. At the same time proved the possibility of using azkamar bentonite for gramicidin-bentonite powder that retains the activity of the antibiotic to two years. Later, in 1957 developed a method for gramicidin-bentonite paste, which is based soap (40%), bentonite (7%), gramicidin (0.6%) and water (52/4%). Thus obtained paste had high bacterial properties and its application for prevention of oil follicular up to 4 times reduces
the skin and dramatically shortens the treatment of patients. In 1959, the gramicidin-bentonite paste was applied also to protect the skin from radiation injuries. Pilot tests conducted in rabbits exposed to gamma rays radiocobalt demonstrated the feasibility of such a paste for prevention of radiation injuries, and for the treatment of ulcers formed after irradiation of the skin by X-rays. Since the early 60-ies appeared the first information about the results of the use of bentonite clays in medical practice. For this purpose we tested different types of local montmorillonite (bentonite) clays, grouped by their chemical composition on the alkali and alkaline earth. During the research focused on the study of their effect on antibiotics and antiseptics. Thus was found a way using alkaline sodium bentonite as gluing and loosens substance instead of food starch, with granulation and tableting of drugs as phenacetin, phenobarbital, and hydrochloride eshinin. Given the gelling properties of bentonites, the latter also used to stabilize the solids in suspensions. In particular, a 5% bentonite gel was used as stabilizing solid substances insoluble drugs used in the form of suspensions in medical practice. In addition, a path is found replace the glycerin in toothpaste 8% bentonite gel, which may replace it without affecting the properties of paste. Bentonite gel also was used for the preparation of emulsions and emulsion-type ointment bases oil/water. Practice has shown that such drugs are well preserved, and emulsion ointment bases have also been very resistant to drying, in contrast to a similar basis, obtained by the introduction of 20% glycerol. Such ointments are well preserved for 6 months, easy to apply on the skin and washed off with water. Clinical trials have shown that they give good results in treating eczema, and lupus erythematosus. Bentonite as stabilizers of suspensions of medical treatment for various skin diseases were also studied in Russia. For these purposes were selected Oglanlin bentonite deposits in Turkmenistan and Verkhneburein deposit in the Khabarovsk. Experimental work has established that the two tested types of bentonite clays effective therapeutic action has Turkmen style, which has high stabilizing properties. Recently oglanlin bentonites were the subject of study of medical-dental. The first specialists were conducted a study to determine bacteriological toxicological properties of bentonite in order to prepare various medicines dental appointment. Experimental results and experiments, as well as clinical trials have yielded positive results. According to them, 10% solution of bentonite used in the experimental group of rats, showed his harmlessness with long-term effects on the hard tissue of teeth and periodontium. In addition, during testing oglanlin bentonite, the latter showed a caries-preventive activity, which was the basis for its application as a therapeutic and preventive means. Applications using 10% solution of bentonite led to compaction of enamel caries as a focal spot, allowing such a remedy was recommended as a therapeutic pads for dental caries. In addition, experiences of using bentonite in dentistry have shown that the scope of their use is not restricted. Bentonite clay as a biologically active and harmless natural substance can be used for the treatment of gingivitis, paradontitov, paradentosis and as anti-allergic, healing and restoring means for hastening the onset of remission in pathological phenomena of periodontal diseases. According to the testimony of experienced dentists Tajikistan, there is the possibility of using
bentonite paste, mixed with a solution of chlorhexidine as a basis for sealing root canals of teeth in patients with chronic fibrous pulpitis and periodontitis. In the future therapeutic and preventive medical practice Tajikistan greater role for the various ointments made of bentonite on the basis of. In particular, the available data, local bentonite will be widely used in dermatology (treatment for various eczema and burns), pharmaceutical (in the manufacture of a wide range of medicines and preventive aids) in gastroenterology (for establishing and improve the gastrointestinal tract), in ophthalmology (for preparation of ointment bases in the treatment of ocular trauma disorders) in surgery and urology (for the treatment of macerated skin in cases of purulent foci after surgery on the urinary and gall bladder, kidneys and handling of catheters To avoid irritation, usually observed after catheterization of the urethra). The foregoing gives grounds to conclude that in Tajikistan, have sufficient resources of raw bentonite and with the developed infrastructure of medical institutions, there are great prospects for its widespread use in practical medicine.
The project of medical geology studies of semnan province, The first phase- the studies of residential areas in Watershed areas of cities Damgan and Shahroud aimed to assess the exact impact of geological units and human activities (agriculture, urbanity, industry, mining, ...) on human health, water quality, soil and plants of the lands that affected by this activity. Preparing the medical geology Atlas and the Pollution Atlas of the desired areas (in different layers including heavy metals species, anions, cautions and ...) was defined and by the contract 100-2164 of 88/04/23 devolved to Mahde Zamin  Shahvar Co. as the consulting engineer.
- Environmental effects of human interaction and the environment (animals and birds, plants, ecology and etc)

- Determining the centers producing pollution (Point and field) of the range of studies and estimating the scale of their polluting.

- Determining the contaminated areas and critical points of the studied range from the perspective of medical geology and environmental geology.

- Preparing the Medical geology Atlas of studies area

- Preparing the Pollution Atlas of studies area within different layers such as heavy metals, anions, cautions and etc

- Providing useful methods to reduce created pollutions and control the destructive environmental factors that threaten the human health.

Types of Information enquired for Project

The Most Important Centers of Study
Stages of Project Implementation

- Overview of previous studies about the area and studied subject
- Doing office studies (map checking, satellite images,) and set the network sampling
- Sampling (initial)
- Presenting the report of first stage
- Analysis of samples
- Initial analysis of samples and analysis of recorded data and drawing diagrams and graphs
- Presenting second report
- Final analysis of data taken
- Drawing charts, graphs, maps and preparation of Pollution and Medical geology Atlas at studied range
- Presenting final report

Project Progress

Since the date of transferring project, and after getting enough information available from organizations and government agencies (Department of Environment regional water companies, ...) and performing details studies about the geological Conditions, population, agriculture and industrial in studied areas, about 74 percent of defined samples in different parts was taken and about 42 percent of these cases were analyses (ICP-MS, anion and caution)
The Results of the Project and Information Analysis

- As: on Average, 6 times the crust average
- Se: on Average, 4 times the crust average
- Ca: on Average, 3 times the crust average
- U: on Average, 2 times the crust average
- Na: on Average, 0.25 times the crust average
- High concentration of sulfur around some industrial and mining complexes (coal mine of Tazareh, coal dressing Tazareh, coke making of Qader Abad, agricultural lands (East and south of Shahroud) and geological units (North East and south of Shahroud)
- The pH of studied areas was alkaline (on average 3.7 ), of course many acidic pH has recorded in downstream of industrial – mining complexes (Shahroud industrial town, coal mine of Tazareh , coke making of Qader Abad) and western edges of south and west of Shahroud.
- EC drastic changes from basin areas in North of shahroud (on average 0.7 ms )to the west and south west lands of studies range (up to greater than 20 ms)
- Nitrate and sulfate pollution of Agricultural lands including the south range of shahroud and extensive parts of Bastam villages, land contour of Basin areas of shahroud and Damqan.
- Geochemical anomalies and pollutions northern lands of shahroud (Nekarman, Abarsage, Meyghan and Abr villages), and southern (Toroud, khors, moaleman) and Eastern lands (Abbas Abad, Foroumad, Miami) of the studies range.
- Intense radiouctivity anomalies in the warersheds Bastam and Toroud

Challenges of Medical Geology

- High Frequency of kidney stones in Biarjomand (and somewhat Shahroud)
- Short stature, osteoporosis and yellow teeth in parts of Miami watershed (under study)
- High Frequency of digestive disorders (stomachache) within the Abr village (under study)
- Attention and intelligence disorders on downstream lands of Firouzeh Bagh mine (under study)
Oral & Poster Presentations

Day2-thuseday 25th June

The second day of symposium was allocated to articles presentation. In sum, 150 articles were sent to the secretariat of the symposium. This figure is considerable for a new born discipline and in comparison to the other symposiums. Out of this figure, 20 articles belonged to foreign participants from Armenia, Georgia, Azerbaijan, Czech Republic, USA, Tajikistan, Turkey, India and Russia. After verification, 25 articles were selected for presentation and 42 were accepted in the poster section. Due to visa difficulties, some of the participants could not participate in the meeting. The articles were in the following areas of medical geology as follows; geochemistry, hydrogeochemistry, natural radiogenics, geobotany, urban geochemistry, etc.
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<td>30 Mojgan Dehghani</td>
<td>Concentration of Selenium in Groundwaters of Anar Plain and its effects on the health of human beings and animals</td>
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<td>31 Hamed Biglari</td>
<td>An Investigate the distribution of geological factors related to human health in drinking water basin of Sistan and Baluchestan, using GIS software</td>
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<td>32 Afshar Zia Tarighi</td>
<td>Medical geology studies of Alaenjaregh of anomalous uranium exploration area in Eastern Azarbijan Province</td>
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<td>33 Kamalodin Onogh</td>
<td>Effect of geological elements and their relationship with dental and bone disorders in drinking water in Iranshahr villages during 2002-2010</td>
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<td>34 Seifolah Haghighi</td>
<td>Monitoring and Simulation of the Karoon River for time Planning and Locations of Drinking Water with regard to Geo-effects</td>
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<td>35 Mehdi Kianian</td>
<td>Health hazards from geological materials (geogenic) in fluoride-rich groundwaters in Koohbanan,Kerman, Iran</td>
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<td>36 Morad Geravand</td>
<td>Epizootiology and ecology of anthrax</td>
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<td>37 Sajjad Borzouie</td>
<td>Assessment of immune surveillance among inhabitants of high natural background radiation areas in Ramsar</td>
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<td>38 Arash Omidi</td>
<td>Assessment of copper, zinc, vitamin E, calcium, phosphorus, magnesium, thyroid and pituitary hormones (T3, T4, TSH), in the aborted ewes and goats of South Khorasan Province</td>
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<td>39 Farnaz Abed Soltan</td>
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<td>40 Pedram Attarzadeh</td>
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Medical Geology Workshops

Day3- Wednesday 26<sup>th</sup> June

Seven workshops were held about different areas of medical geology in the last day of symposium. In sum, 120 participants took part in these 2 hour workshops, simultaneously.
1- A review of evolution of heavy metal concentrations in the environment from geological formations to man-made accumulations

Presenter: Dr. Armen Saghatelyan

This workshop included the following items:

- Environmental heavy metals
- Heavy metals: Key environmental issues
- The role of Elements in human organism
- Heavy metals in soils and grounds of tailing repositories
- Natural and man-made geochemical association of heavy metals in Yerevan soils (A case study in Armenia)

2- Pollution Mechanisms of Groundwater in Karts Aquifers

Presenter: Dr. E. Raeisi

This workshop included the following items:

- Karst definition
- Karst Features (sinkhole, cave and conduit, grike, spring, … )
- Water uses
- Type of flow (diffuse and conduit)
- Type of recharge
- Sources of pollution
- Main pollutants (microbe, nitrate, pesticide, hydrocarbon, heavy metal, …)
- Contaminant transport
- Groundwater overexploitation
- Saline water intrusion
- Reasons for karst groundwater vulnerability
- Karst water Protection
- Karst of Iran
- Case studies

3- Pesticide Regulations in Developing Countries

Presenter: Dr. A. Mahdavi (University of Tehran)

- Pesticides
- Health effects of pesticides
- Preventing Intentional and Unintentional Deaths from Pesticide Poisoning
- Typical pesticide uses in developing countries
Growing Markets In Developing Countries
Pesticide Management and regulations
Concerns about Regulations in Developing Countries

4- Practical Geobotany
Presenter: Dr. SH. Zarre

This workshop included the following items:

- Collection of plant material: principles
- Preservation of plant material for identification and analysis
- Looking for relationship between chemical anomalies in plants and patterns of disease distribution
- Interpretation and spatial analysis

5- Human Radiation Exposure from Environment
Presenter: Dr. Monazzam

This workshop included the following items:

- Exposure Pathways
- Radionuclide Biologic Performance in Human Body
- Radio Toxicity
- Radionuclide in Soil
- Plant Absorption
- Soil-Plant-Human Pathways

6- Remediation: a review on available remediation techniques
Presenter: Dr. F. Moore

This workshop included the following items:

- Classification of different groups of soil pollutants
- Identification of remediation techniques and methods
- Comparison between different methods and selecting the best one

7- Urban Environmental Geochemistry
Presenter: Dr. S. Modabberi
This workshop included the following items:

- Geochemical studies in the urban environments
- Background, Baseline and contamination concentrations
- Sampling, analysis and data interpretation for geochemical studies in the urban environments
- Urban soils
- Urban dust
- Urban groundwater issues
- Surface runoff in the urban environments
- Remediation of contamination in the urban environments
Closing ceremony

Attendees at the Symposium, held under the auspices of Geological Survey of Iran (GSI) and UNESCO
At the end of symposium, a ceremony was held. Symposium holding committee, referees, authorities of the Geological Survey of Iran and foreign participants were the members of closing ceremony. At the beginning, Ms.Rahmani, the secretary of symposium thanked all participants, including foreign guests, Iranian authorities and the GSI colleagues. Ms.Rahmani also added,"Since the Geological Survey of Iran is the representative of IMGA in the Middle East, the IMGA was aware of holding symposium from the beginning, and the deputy head of IMGA welcomed holding this symposium, but due to illness, the deputy head of IMGA could not take part in the symposium and only sent a movie for inaugural session.” The symposium secretary was perfectly happy about holding this symposium at national and international level and evaluate it is as an acceptable and suitable program. As the period of this symposium was very limited and programs were diverse (special speeches, workshops, etc.) , among 150 articles, only limited number of articles and posters were accepted to be presented. Iran and its neighboring countries are on diseases’ belt having environmental origin. Therefore, collaboration with experts of other countries can assist in finding the root of various diseases. In addition, participants were invited to prepare a proposal on effective geological risk factors about esophagus cancer in the related belt in mid-Asia. The proposals will be submitted to UNESCO to prepare a more suitable environment within neighboring countries.

Then, Dr.Ghoreshi, the senior advisor of the GSI expressed his gratitude to the audience for their participation in the medical geology symposium. He also said, “The symposium is the first step for future collaborations.”

Dr.Ghasemi, the deputy for geology of the GSI thanked the authorities involved in holding the symposium, including colleagues in the medical geology and international affairs divisions. Dr.Gashemi announced the readiness of the GSI for future international collaborations on medical geology issue. He said that we all anticipated a fruitful collaboration in future.

Dr. Yaghubpur, the senior advisor of medical geology project and the member of symposium referees said, “Establishment of medical geology division is a great success for the GSI and it is result of collaborations with young colleagues.” He also said,"Diseases are always close to us, and in order to overcome this problem, collaboration with experts in geology, agriculture, biology, different branches of medicine, etc. is compulsory. Therefore, the GSI welcomes all constructive suggestions, and the priority is with neighboring countries in this respect.”

Dr.Moore, the advisor of geology project and faculty member of Shiraz University thanked foreign guests for their participation and expected future fruitful collaboration. He advised to establish a regional center for medical geology. He also said, “Having a regional and global understanding on medical geology issues can be very helpful.”
Dr. Zare, the scientific advisor of medical geology project and faculty member of Tehran University said that the symposium was successful in introducing the subdisciplines of medical geology, particularly geobotany.

Some of the foreign participants as representative of others mentioned their point views on holding this symposium.

Dr.Kribek from the Geological Survey of Czech Republic said that holding this symposium in Iran is a positive step to promote medical geology studies. He also hoped to collaborate with the GSI in this respect in future.

Dr.A.Saghatelyan, the head of Ecologic Studies Center of Armenia was one of the guests who had an active role in the meeting by presenting speech and holding workshop. He said that co-ordinations were appropriate for holding the meeting. In fact it was an occasion for assessment of the GSI, university researchers and Iran research projects capabilities.

Dr.N.Zakariadze, the head of a research NGO, working on environmental issues in Georgia mentioned that it is a good idea to establish a regional geology association for neighboring countries and expressed hope to exchange data among the researchers in future.

Dr.Z. Al Jallad from Syria said that holding of symposium for a new-born field like medical geology was very far from mind, but the Geological Survey of Iran could overcome this issue and solve this matter. This symposium made us familiar with the scientific achievements of the GSI and our other colleagues from other countries of the world. We hope to develop and promote medical geology studies of our country by these meetings.

At the end of the ceremony, symposium referees; Dr. Yaghubpur, Dr.Mor, Dr.Modabberi, Dr.Aftabi and Dr.Zare as the chairman of sessions were acknowledged for their judgement about articles, holding workshops and controlling the speeches’ sessions. Dr.Ghasemi the deputy for geology of the GSI and Dr.Ghoreshi were received the souvenir award and acknowledgment plate of the symposium. In addition, foreign participants received the acknowledgment plate, souvenir award and the Medical Geology atlas of Iran.