



Medical Geology: Impacts of the Natural Environment on Public Health

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Dear Colleagues,

All living organisms are composed of major, minor, and trace elements, given by nature and supplied by geology. Medical geology is a rapidly growing discipline dealing with the influence of natural geological and environmental risk factors on the distribution of health problems in humans and animals. As a multi-disciplinary scientific field, medical geology has the potential of helping medical and public health communities all over the world in the pursuit of solutions to a wide range of environmental and naturally induced health issues.

The natural environment can impact health in a variety of ways. The composition of rocks and minerals are imprinted on the air that we breathe, the water that we drink, and the food that we eat. For many people this transference of minerals and the trace elements they contain is beneficial as it is the primary source of nutrients (such as calcium, iron, magnesium, potassium, and about a dozen other elements) that are essential for a healthy life. However, sometimes the local geology can cause significant health problems because there is an insufficient amount of an essential element or an excess of a potentially toxic element (such as arsenic, mercury, lead, fluorine, etc.), or a harmful substance such as methane gas, dust-sized particles of asbestos, quartz or pyrite, or certain naturally occurring organic compounds.

Current and future medical geology concerns include: dangerous levels of arsenic in drinking water in dozens of countries including the USA; mercury emissions from coal combustion and its bioaccumulation in the environment; the impacts of mercury and lead mobilizations in regions where artisanal gold mining is conducted; the residual health impacts of geologic processes such as volcanic emissions, earthquakes, tsunamis, hurricanes, and geogenic dust; exposure to fibrous minerals such as asbestos and erionite; and the health impacts of global climate change. Billions of people, most in developing countries, are afflicted by these and other environmental health issues that can be avoided, prevented, mitigated or minimized through research and educational outreach.

This Special Issue of Geosciences discusses recent advances in medical geology, providing examples from research conducted all over the world. Among the topics to be discussed are:

- Health effects from trace elements, metals and metalloids
- Regional and global impacts of natural dust (including the study of nanoparticles)
- Chemical and environmental pathology of diseases associated with natural environment
- Novel analytical approaches to the study of natural geochemical and environmental agents
- Research on beneficial health aspects of natural geological materials
- Risk management, risk communication and risk mitigation on medical geology
- Remote sensing and GIS applications on medical geology
- Epidemiology and public health studies on medical geology
- Climate change and medical geology
- Clinical and toxicological research on biomarkers of exposure
- Veterinary medical geology
- Biosurveillance and biomonitoring studies on medical geology

Original research on these topics will be welcome for this Special Issue.

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