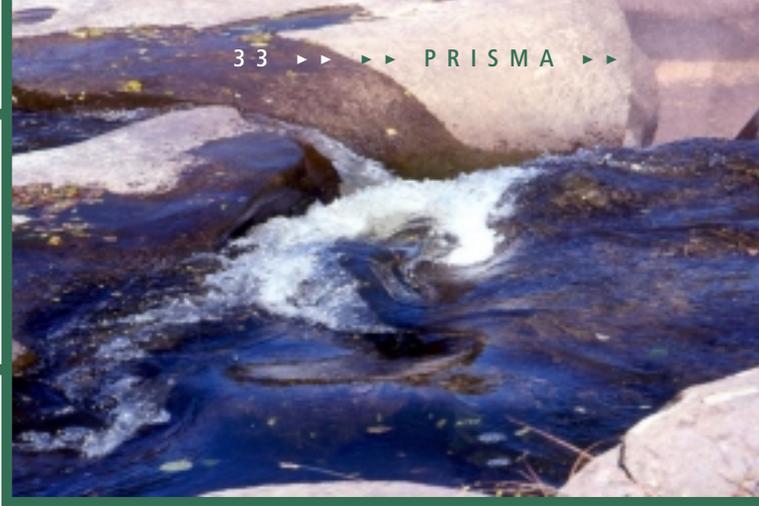




Chandrasekara Bandara Dissanayake

Often it is the drinking water that transports geological materials detrimental – or beneficial – to human health.



## GEOCHEMISTRY

# Medical Geology – a fascinating new science

THE IMPORTANCE OF ROCKS, MINERALS AND SOILS FOR HUMAN AND ANIMAL HEALTH

By Chandrasekara Bandara Dissanayake

There is a unique interdependence of the different components that comprise the earth. The fundamental building blocks of the earth – the rocks and minerals, therefore, must have a bearing on the human and animal populations that live on these earthy materials. Indeed, the influence of rocks, minerals and soils on human and animal health is best seen in the tropical countries. A few interesting examples of this correlation of geology and human health will now be briefly discussed.

The geochemistry of fluorides in groundwater and dental health of communities, particularly in those depending on the groundwater for their drinking water supplies, is one of the best known relationships between geology, water and health. Fluoride is an essential element, notably for teeth. However, an excessive intake can be detrimental to health. When the fluoride content of the drinking water exceeds a value of about 1.5 milligram per litre, and when such water is ingested particularly by children under seven years of age, the teeth develop a dark brown coloration and mottling, resulting in a disease called “dental fluorosis”.

The link between geology and iodine deficiency diseases (IDD) is another interesting aspect of the study of medical geology. Iodine deficiency is the world's most common cause of mental retardation and brain damage with about 1.6 billion people at risk and 50 million children affected.



Child suffering from “dental fluorosis”, a disease caused by an excessive intake of fluoride.

One of the most intriguing, yet not very well defined aspects of medical geology, is the correlation between the incidence of cardiovascular diseases and water hardness in the areas under consideration. Even though a simple correlation does not necessarily mean causation, the negative relationship between water hardness and cardiovascular diseases observed in many terrains has initiated extensive research into the medical aspects of water hardness. At present, there appears to be mounting evidence for the role of magnesium present in the hard water as a cardio-protective element. The geology of a terrain is therefore of relevance in epidemiological studies related to water quality.

The geochemical basis for “geophagy” – the practice of eating clay or soil – is yet another interesting study of medical geology. Some varieties of clay are eaten, mostly by pregnant women in the tropics and also by some animals such as horses, monkeys and birds. There is much interesting debate concerning the medical benefits and ill-effects of eating clay.

The biggest environmental disaster in modern times, affecting millions of people living in West Bengal and Bangladesh, namely arsenic poisoning, has its origin in the geology and mineralogy of the sediments of the deltaic plains. As a science, with improvements in analytical techniques, Medical Geology is expected to have many interesting applications in the future, especially in the tropical countries, and the influence of geological materials on human and animal health will be the basis for future epidemiological studies. ◀

**Professor Dr. Chandrasekara B. Dissanayake**  
**Fachgebiet: Geochemie**  
**Förderprogramm:**  
**Humboldt-Forschungsstipendium**  
**Gastinstitutionen:**  
**Universität Erlangen-Nürnberg**  
**Institut für Geologie und Mineralogie**  
**Universität Mainz**  
**Institut für Geowissenschaften**  
**Heimatinstitution: University of Peradeniya**  
**Department of Geology**  
**Peradeniya/Sri Lanka**