

A GLOBAL GEOCHEMICAL DATABASE

FOR ENVIRONMENTAL AND RESOURCE MANAGEMENT

Recommendations for International Geochemical Mapping Final Report of IGCP Project 259

A.G. Darnley (Canada), A. Bjorklund (Finland), B. Bolviken (Norway),
N. Gustavsson (Finland), P.V. Koval (Russia), J.A. Plant (UK), A. Steenfelt
(Greenland), M. Tauchid (IAEA) and Xie Xuejing (China),
with contributions by R.G. Garrett and G.E.M. Hall (Canada)

Abstract

Research conducted since 1988 as part of the International Geochemical Mapping (IGM) project has confirmed that the presently available data concerning the geochemical composition of the Earth's surface are substantially incomplete and internally inconsistent. Many of the older data sets have serious deficiencies and do not meet basic requirements for establishing the range of natural geochemical background values. As a result of natural geological and environmental processes, element abundances in natural materials can vary by several orders of magnitude within short distances. These variations are inadequately documented and their existence is often overlooked in the setting of public policy. A high quality geochemical database is pertinent to a wide range of investigations in the earth and life sciences, and should be considered as an essential component of environmental knowledge. Detailed information about the natural variability of the geochemical background is pertinent to administrative and legal issues as much as to scientific research. Sustainable long-term management of environmental and mineral resources is dependent upon a comprehensive and reliable database. The International Geosphere-Biosphere Program on Global Change requires information on current conditions. Important aspects of change cannot be measured, or their consequences anticipated, unless the present composition of the earth's surface materials is known.

The International Geochemical Mapping project, which was endorsed in 1988 as a contribution to the IGBP (IGBP, 1989), is a multi-stage project established to consider how best to provide quantitative data to portray the geochemical diversity of the earth's land surface. Participants in IGCP 259 have undertaken a comprehensive review of methods of regional and national geochemical mapping and examined the results obtained. Many problems have been identified and a variety of solutions discussed. Field and laboratory research has been carried out. The resulting recommendations are contained in this report. They are directed towards geochemists and those institutions, which have a mandate for providing an earth science and/or environmental database.