THE ROLE OF GEOCHEMICAL BASELINES IN THE ASSESSMENT OF CONTAMINATED LAND.

Alex J. Ferguson, Fiona M. Fordyce, Marcello Di Bonito and Thomas R. Lister.

Analytical and Regional Geochemistry Group, British Geological Survey, Keyworth, Nottingham, NG12 5GG, UK. Tel: 0115 936 3100

Introduction.

In the light of recent UK and European legislation there is a need to identify and quantify the potential hazard of contaminated land. The classification of affected areas requires the definition of 'safe levels' of Potentially Harmful Elements and Species (PHES), in some cases initial guideline values have proved to be less than satisfactory. For example, when the Council of European Communities (CEC) guideline for nickel was applied to regional geochemical baseline data in Finland, extensive areas of the north-west of the country were designated as contaminated. In the UK, many areas of naturally occurring elevated background arsenic concentrations are above the Inter-governmental Committee on Redevelopment of Contaminated Land (ICRCL) trigger values. It is clear that such guideline values are in need of modification. Geochemical baselines have a vital role in providing improved data for the provision of realistic guidelines. Geochemical baseline data is an essential tool for the identification of areas with concentrations of PHES in excess of the guideline values at national, regional and local scales.

An Integrated European Baseline.

Information on levels of background and elevated contamination in the surface environment already exists in most European countries, where information has been collected by organisations such as Geological Surveys, Soil and Agricultural Institutes. However, due to differing national priorities this information has not been collected systematically and data are based on a range of sample types and parameters determined by a range of analytical techniques. In order for these national data sets to be employed at the European scale a normalised baseline is required. The Forum of European Geological Surveys (FOREGS) are preparing a geochemical baseline for Europe to provide this normalised background which will enable contaminated land to be put into context. The FOREGS survey is based on the collection of stream sediment, stream water, soils, floodplain deposits and humus samples, to provide an integrated understanding of the geochemistry of the surface environment.

National Scale Assessment

The British Geological Survey (BGS) Geochemical Baseline Survey of the Environment (G-BASE) provides regional baseline data for stream sediment, stream water and soil in the UK. At present, data are available for Scotland, Wales and much of the North of England at a density of approximately 1 sample site per 2 km^2. These data provide a multi-element background geochemistry which enables the identification of broad scale patterns of elevated concentrations of PHES. Figure 1 shows copper concentrations measured in stream sediments across the north