

Geochemical Mapping of the Rural and Urban Environment: an Aid for the Detection of Contaminated Land.

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The cost-effective reclamation of contaminated land and/or water resources requires a detailed knowledge of the current state of contamination and an understanding of the natural background to which the site may be most appropriately returned. Within this context, the British Geological Survey is in the process of completing a systematic national geochemical survey of the UK surface environment based on the collection of stream sediments, soils and stream waters to produce a series of geochemical maps which can be integrated with other environmental information to produce valuable baseline and benchmark data for both rural and urban environments.

Environmental monitoring programmes traditionally concentrate on temporal changes and are based on the measurement of a limited number of parameters through time. The spatial environmental database collected under the Geochemical Baseline Survey of the Environment (G-BASE) programme is complementary to existing monitoring programmes, in that a wide range of major and trace element determinations are made which enable the presence of potentially harmful trace element data to be placed in the context of major-element chemistry and other physicochemical parameters such as soil pH and organic matter content. This additional contextual data, which is absent from most monitoring programmes, allows:

- _ the establishment of a realistic baseline directly relating to on-site hazards
- _ the assessment of the relative mobility and toxicity of potential hazardous contaminants
- _ the modelling of remedial scenarios within a well-established baseline framework
- _ the delineation of relative risk factors across a number of spatial scales

The G-BASE programme has now covered Scotland, northern England, Wales and the Welsh Borders, and parts of central England with systematic geochemical coverage. As an adjunct to studies in the rural environment, selected urban areas have been sampled to provide baseline geochemical data for the Built Environment. In rural areas, the survey is based on the collection of stream-sediment samples, stream waters and heavy-mineral concentrates at a density of approximately 1 sample per 1.5 km². In areas where the drainage network is poorly developed, particularly in eastern England, soil samples are collected on a systematic basis at a density of 1 sample per 2 km². Soil sampling in urban areas is based on 4 samples per 1 km² on a regular grid.

This poster describes recent progress in the collection and interpretation of data, including: (1) urban geochemistry, with examples drawn from studies of Wolverhampton that illustrate the relationship between past industrialisation and the presence of elevated concentrations of potentially harmful trace elements; (2) the completion of the Welsh stream-sediment and stream-water survey a benchmark in the integrated mapping of stream waters and stream sediments; and (3) the development of thematic geochemical mapping at local and regional levels, which offers considerable scope for environmental assessment.