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## Geochemistry

Geochemistry is the study of the chemistry of geological materials.

Geochemistry is an important tool in investigating the detailed composition of geological materials, as well as facilitating interpretations of the processes which have formed, and continue to influence, these materials. A range of analytical techniques in isotope geochemistry provide a range of methods for dating geological materials. Studies of regional geochemistry are important in mineral exploration and offer important means of investigating the distribution and dispersal of chemical elements in the environment.

An area's geochemistry must therefore be viewed as an aspect of its geodiversity.

### Geochemistry in County Durham

Geochemistry contributes greatly to our understanding of many aspects of County Durham.

In this section only those aspects of geochemistry which have most obvious impact upon geodiversity are considered. Key literature references from the substantial technical literature on the geochemistry of Northern England, including County Durham, are listed in the bibliography.

Significant research on the geochemistry of minerals and mineral assemblages from the ore deposits of the Northern Pennine Orefield have greatly advanced understanding of the nature and origins of these deposits, including the framing of important hypotheses on the origins of similar deposits worldwide. Particularly significant has been work on fluid inclusions and concentrations of rare earth elements.

Advances in isotope geochemistry have been applied to determining the absolute ages of the Whin Sill and Weardale Granite.

The distribution of a large range of chemical elements in stream sediments and stream water across the county, as determined by the British Geological Survey, is depicted in two Geochemical atlases. A geochemical image, typical of those in the atlases, is illustrated in (Figure 27). In addition to indicating patterns of natural dispersion which may inform understanding of the local and regional geology and aid mineral exploration, these give important insights into the anthropogenic dispersion of a variety of elements, including those related to former coal and metal mining, and iron and lead smelting.

The lead map (Figure 27) is dominated by the influence of mineralisation in the Carboniferous rocks, especially the ore-deposits that are strongly enriched in the element. In this area, the spread of colliery waste over the Durham Coalfield and of spoil from the Northern Pennine Orefield have had a very substantial influence on the regional geochemical patterns.

The distribution of chemical elements may inform and explain aspects of biodiversity.

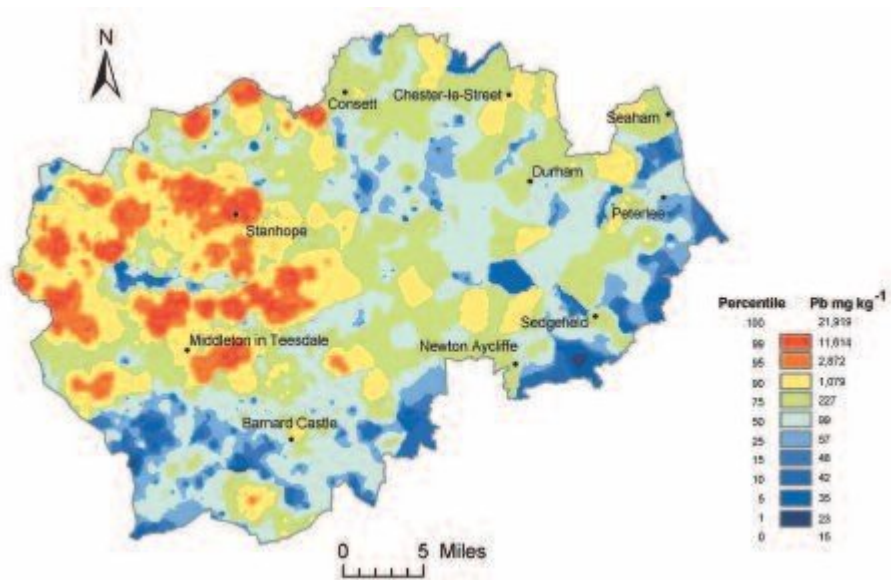
### Selected references

British Geological Survey, 1992, 1996; Say and Whitton, 1981.

### Figures

(Figure 27) The distribution of lead in stream sediment and soil over County Durham.

[Full references](#)



(Figure 27) The distribution of lead in stream sediment and soil over County Durham.