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POSTER ABSTRACT: The identification of mining related contamination in the U.K. using high resolution geochemical mapping: examples from north-east England and North Wales.

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Abstract

The Geochemical Survey programme (GSP) of the BGS is currently undertaking the systematic multi-element regional geochemical mapping of the U.K. landmass. The GSP database presently holds information on the concentration of up to 35 elements determined in stream sediment, stream water, heavy mineral concentrate and soil samples collected at an average density of one sample per 1.25 sq. km in an area of northern Britain extending from Shetland to North Wales. Regional geochemical maps based on analysis of high density stream sediment samples from north-east England and North Wales, both of which contain historically important mining fields are presented here. The Northern Pennine Orefield has been worked from Roman times until the early parts of this century primarily for galena but also for associated Zn, Ba and Cu bearing ores. The many historical mining centres of North Wales include Halkyn-Minera (Pb-Zn), Llanrwst (Pb-Zn), Llansannan (Cu-Pb-Zn), Beddgelert (Cu-Pb-Zn) and Parys Mountain, Anglesey (Cu).

The long term extraction and processing of metalliferous ores has strongly influenced the geochemical patterns of both regions discussed, notably leading to greatly increased levels of potentially toxic trace elements in the surface environment over large areas. The magnitude and geographical extent of contamination is clearly resolved by the drainage geochemical maps in both study areas. In NE England average levels of 2000 ppm Pb and 10 ppm Cd are common over hundreds of sq. km of the mining field. The data also emphasise that trace element contamination extends considerable distances from source along the floodplains of major rivers draining the orefield. This is particularly noticeably in the Vale of York, an important agricultural region. High levels of heavy metals are associated with all the known mining areas of North Wales, dispersion outside the direct vicinity of the orefields however is not apparent. Information regarding trace element contamination of the environment is of growing importance. Links between element excesses and animal/crop health are well established, and geochemical data are of increasing significance in land use planning and environmental impact assessment studies.