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GEMAS: Interpretation of continental scale soil mapping at the scale of Ireland and the UK

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A subset of the GEMAS dataset covering the UK and Ireland has been investigated. A total of 169 grazing land samples (Gr) and 159 arable land samples (Ap) were collected in the UK and Ireland as part of the EuroGeoSurveys GEMAS project, and represent a very low density survey of the two neighbouring countries. The UK and Ireland have geological commonality from the Proterozoic to Quaternary deposits, quite distinctive from parts of continental Europe. The surface bedrock geology and glacial deposits vary on a scale many orders of magnitude greater than the GEMAS sampling density (one sample per 2,500 km2); an investigation of the UK and Ireland GEMAS data is a good test of the value of low density soil surveying in geologically diverse areas.

Elements including As, Ca, Cr, Ni, Li, Fe, Zn and Pb show spatial distributions that can in part be interpreted as reflecting the broad geological mapping and are generally good at revealing geogenic patterns.

Around cites in the UK and less so in Ireland, Hg, Cu and Au show distinct anthropogenic patterns. This may in part be a reflection of both survey design (of agricultural soil taken from rural locations) and of the variable population densities and degree of urbanisation across the two countries.

The impact of depositional processes from rainfall can be seen in the Se data at a European scale along the length of the Atlantic margin; however, input from farm management practice may also be contributing to the elevated Se values evident in the GEMAS data from Ireland.

While the GEMAS data is an excellent snapshot of the agricultural soil quality of Europe, limitations exist in applying interpretations at smaller scales. In the case of the UK and Ireland, these limitations are due to the heterogeneity at a regional to country scale of bedrock or soil parent material, glaciation and urbanisation.