British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

The London Earth field survey: collection of samples and data

Paul Everett and the G-BASE team

Introduction

The London Earth field survey followed a systematic sampling approach to collect a representative suite of soil samples from across the capital. Samples were taken from a variety of land uses, in order to ensure a robust, unbiased dataset which will represent the baseline geochemistry of the city's environment.

In addition to the collection of samples, important accompanying information including observations about the soil and details for each sampling site were recorded. This data is an important aspect of the survey as it allows us to assess the site and supports interpretation of the geochemical results.

The combination of the geochemical survey and related field observations provides a comprehensive data resource which will provide valuable information for land-use planning and development applications such as urban regeneration and contaminated land assessments.

The field survey

The London Earth field survey consisted of a total of 6635 sampling sites, representing the entire area within the administrative boundary of the Greater London Authority (GLA) at a sampling density of four samples for every square kilometre. Each sampling site was situated as near as possible to the centre of each 1 x 1 km grid square of the British National Grid, in order to achieve a grid of high density sample coverage for the entire GLA with samples spaced approximately 500 m apart.

Samples were collected during a series of field campaigns which ran from 2005 to 2009. The fieldwork each season was carried out by a team of student volunteers led by BGS staff. The students are first trained in G-BASE (Geochemical Baseline Survey of the Environment) standard sampling procedures. Following these precise geochemical sampling techniques and survey procedures, ensured a high quality, robust dataset which is comparable to other city-wide and national geochemical surveys. The work gives the students practical experience in geochemistry as well as being an enjoyable summer job.

Sample collection

Samplers were trained to take samples using a hand auger, to collect soil from three different depths at each sampling site in order to represent different parts of the soil profile; surface soil (0–5 cm depth), topsoil (5–20 cm depth), and deeper soil (35–50 cm depth).

At each site, a composite sample was collected which comprised material from five auger holes to ensure a representative sample.

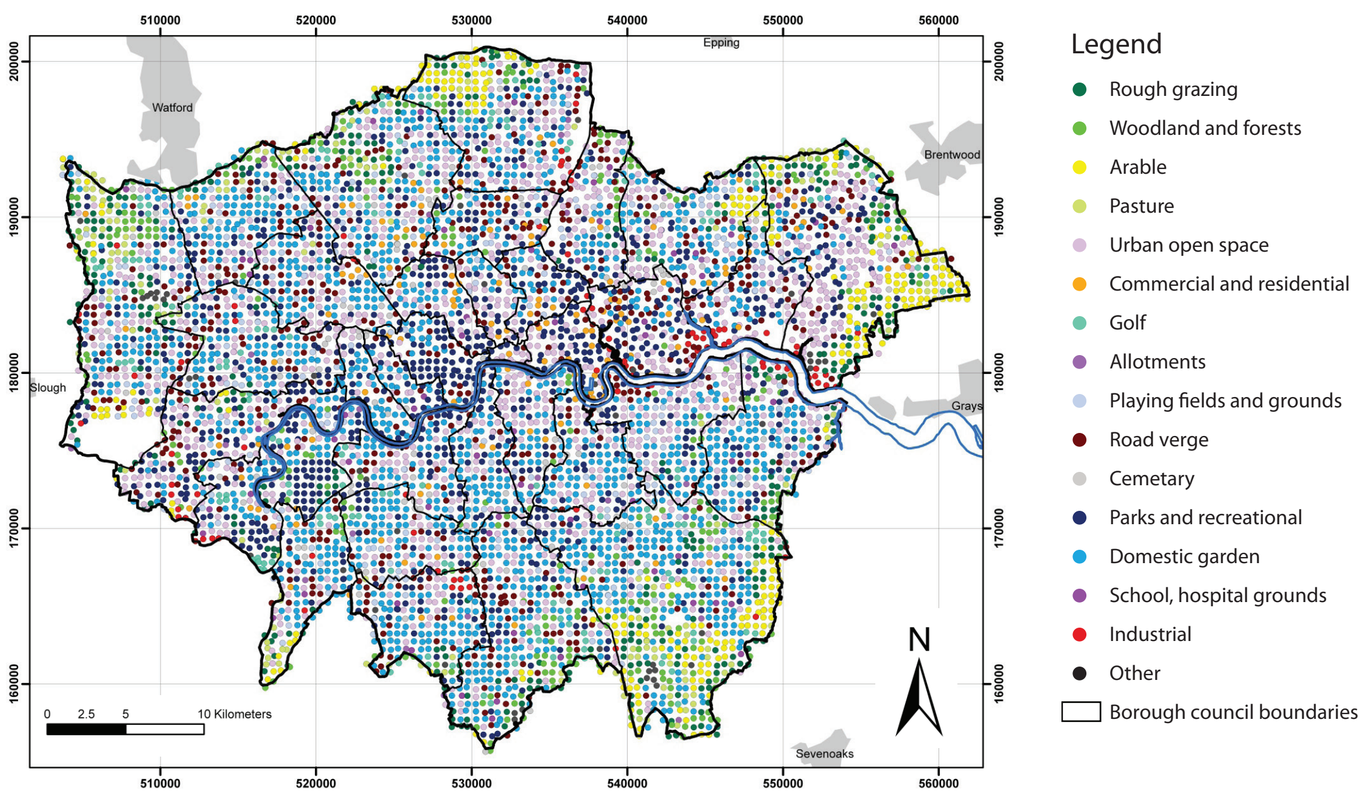
The survey was not targeted at particular sites or land uses, and did not aim for or avoid any anticipated sources of contamination. This unbiased approach is important to ensure results form a representative snapshot of the urban environment as a whole.

Field observations

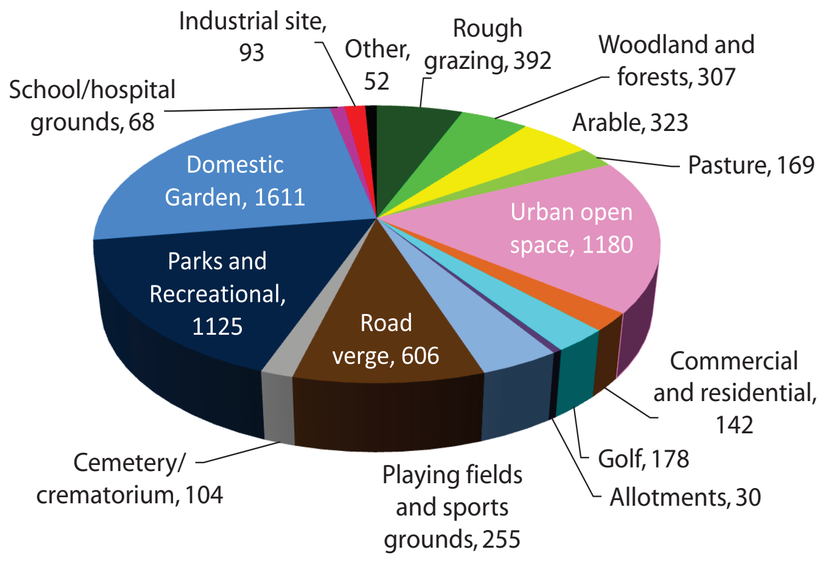
At each site, information relating to the sample was recorded on a field card. This includes particulars such as date, the names of samplers and the location, and also a set of field observations of many different factors which can influence the geochemical properties of the soil sample, such as;

- land use at site
- soil colour and texture
- any contamination that was observed at site.

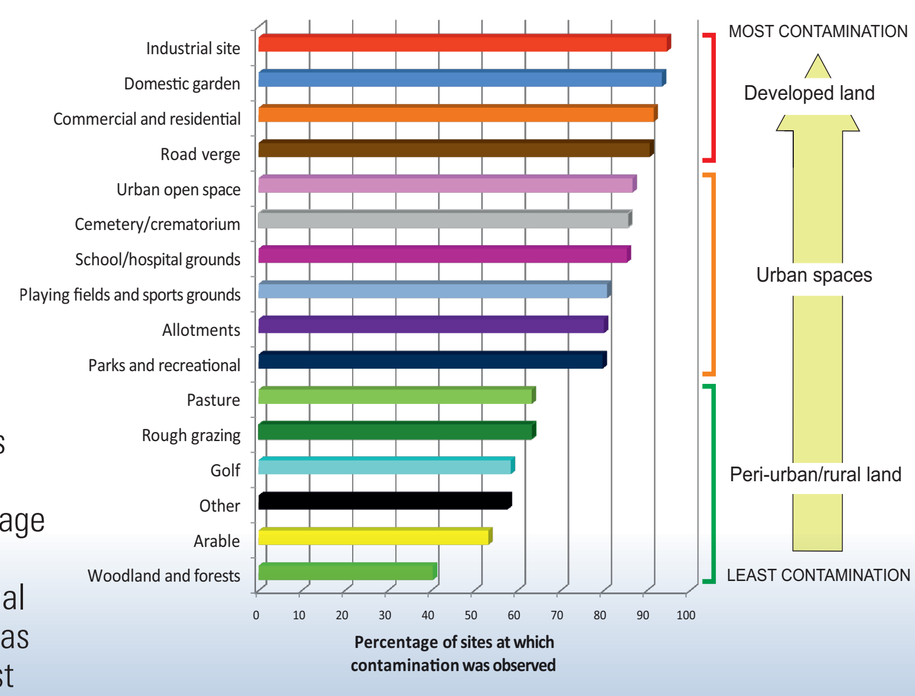
The data collected on field cards was then entered into a field database using Microsoft Access. The occurrence, abundance and distribution of any of the observation types above can be easily shown by interrogating the field database using GIS and statistics packages such as Microsoft Excel. The database can also be integrated with geochemical data.

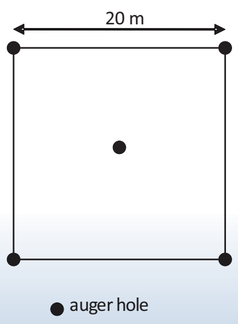


The land-use map above shows the distribution of the land-use types which were sampled. Some zones of a particular land-use type can be clearly seen; Industrial sites around the Lee Valley, Creekmouth and Purfleet, arable land around the more rural areas towards the edges of the GLA, samples from parks and recreational land uses in Richmond Park and Hyde Park, etc. This map and the field data could be used to help identify if geochemical signatures can be assigned particular land use types or zones.



The pie chart above shows that samples were most often taken from domestic gardens, followed by urban open spaces, and then parks and recreational grounds.





Plan of auger holes at a sample site, showing spacing. This ensures a representative sample.

Student volunteers receiving training in standard sampling procedure.

What is the most contaminated land type?

Developed land, such as industrial sites (the most contaminated), urban and residential areas have a higher percentage of contaminated sites than urban open spaces such as parkland and recreational areas. Rural/peri-urban land uses such as woodland and farmland have the lowest percentage of sites where contamination was observed *(see graph at right)*.

Contact information

Paul Everett www.bgs.ac.uk email: paer@bgs.ac.uk