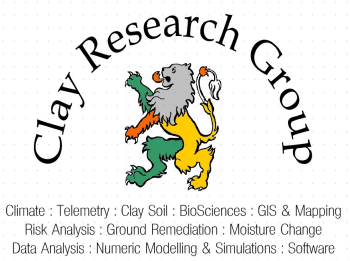
The
Clay Research Group

RESEARCH AREAS

Climate Change : Data Analysis : Electrical Resistivity Tomography
Time Domain Reflectometry : BioSciences : Ground Movement
Soil Testing Techniques : Telemetry : Numerical Modelling
Ground Remediation Techniques : Risk Analysis
Mapping : Software Analysis Tools
Electrokinesis Osmosis
Intelligent Systems



Edition 128

January 2016

The Clay Research Group

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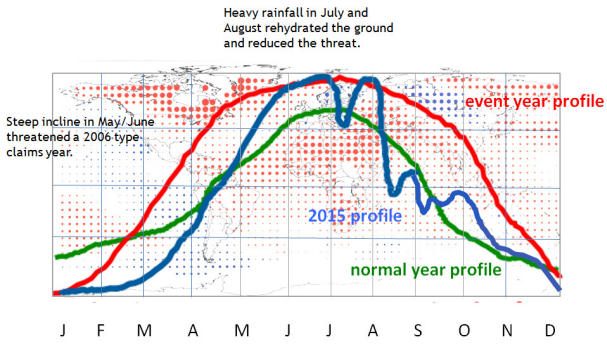
Edition 128, January, 2016

SMD GRAPH

August 2015



SMD data provided courtesy of the Met Office. Data for Tile 161, medium AWAC, grass cover. (best viewed on screen)

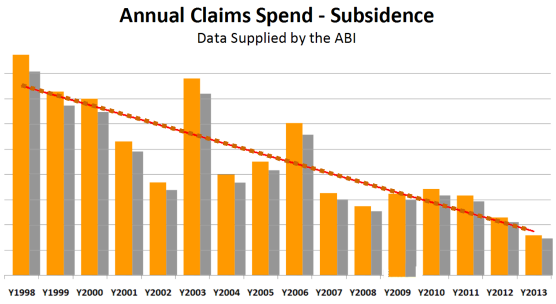
Year End Review

The wettest and warmest December since records began according to the Met Office. Intermittent rainfall throughout 2015 reduced the number of subsidence claims.

Another busy year for the CRG both in terms of supplementing the data we hold and extending research into methods of stabilising shrinkable clay soils and improving our understanding of the Intervention Technique where the objective is tree retention.

We hope to extend the research into EKO to establish the degree of shrinkage that takes place following treatment and explore other uses.

We don't have the up-to-date figures for subsidence claims and losses but numbers are falling and continue to follow the trend shown below.



Good news of course for homeowners and insurers but the cause of this reduction (increased rainfall) has delivered more substantial losses under the flood peril.

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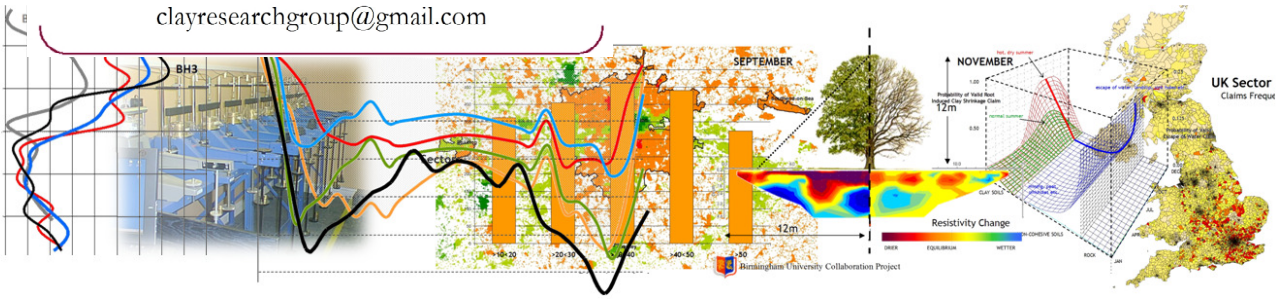

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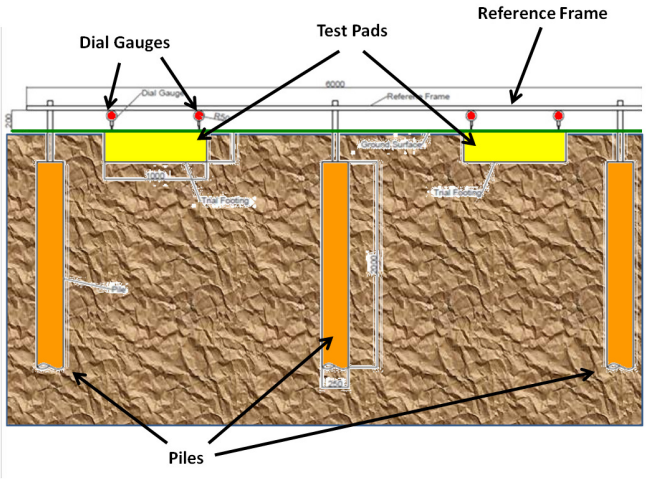
UNIVERSITY OF BIRMINGHAM

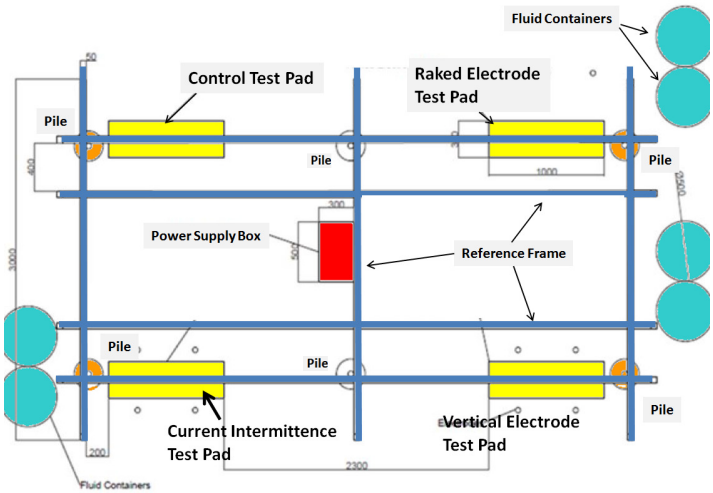
EKO research at the Aldenham site

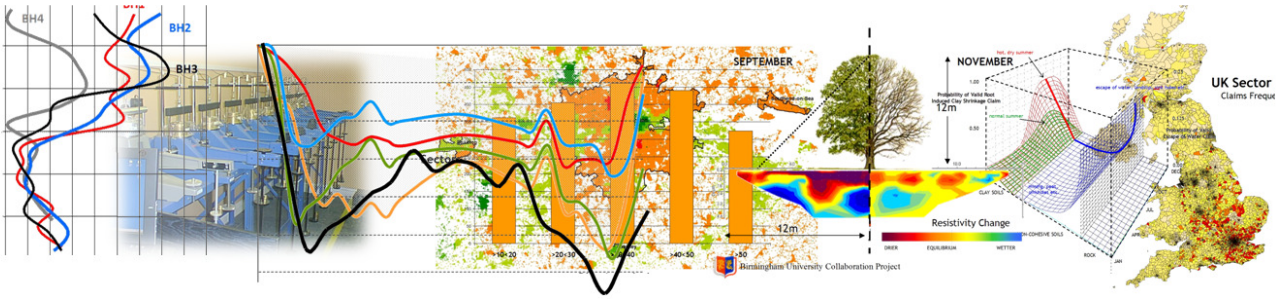
Photographs courtesy Professor Ian Jefferson,
Birmingham University

Continuing on from last month's article, the following two pages include images from Professor Jefferson's talk at the 2015 Aston Subsidence Conference describing the work undertaken by Tom Clinton towards his PhD.



Above, a section through the test site showing the location of the concrete pads (shaded yellow) and the reference frame supported on piles. Below, a plan of the installation showing the arrangement of the electrodes at each of the test pads. One set of electrodes were installed vertically and another at an angle. A third used intermittent current and the fourth was a control with no treatment applied.





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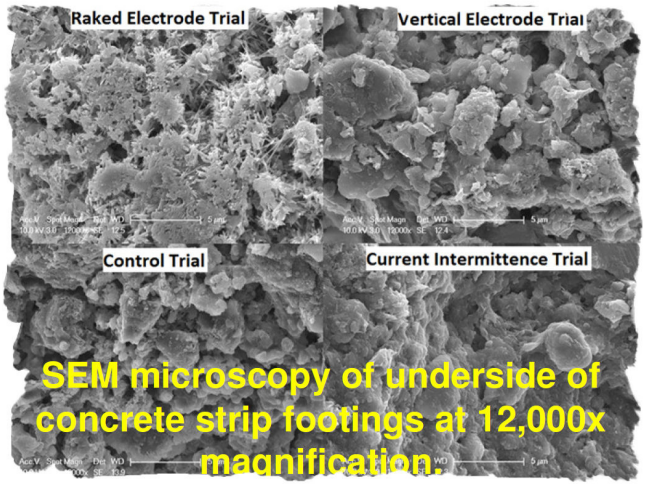
EKO research at the Aldenham site

Photographs Courtesy of Professor Ian Jefferson, Birmingham University

One of the issues that Tom Clinton explored was the possible deterioration of the concrete based on the range of treatments. Would the treatment damage the concrete?

A visual inspection using a Scanning Electron Microscope (SEM - a type of electron microscope) produced the images below.

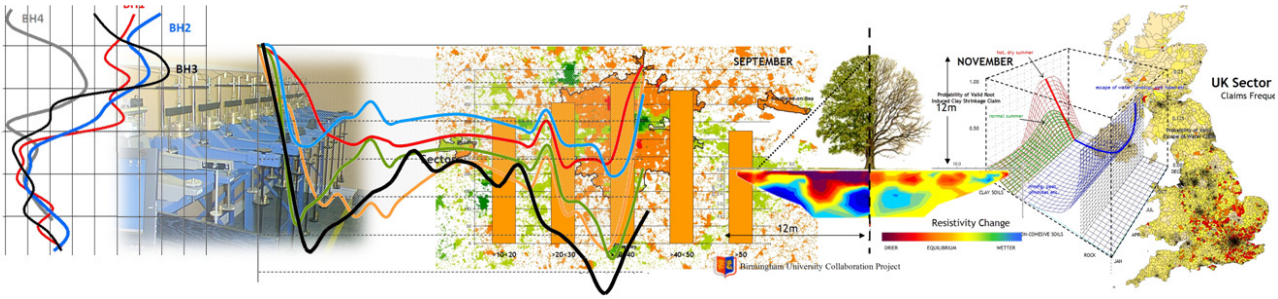


Foundation Piling Ltd

Sponsorship of EKO Research

Foundation Piling Limited provided substantial funding in support of this research under the direction of John Peterson, the MD of the company,

In addition to direct sponsorship, Foundation Piling arranged protective fencing at the site of the willow, installed the test pads, the scaffold rig, sank piles and arranged monitoring etc.



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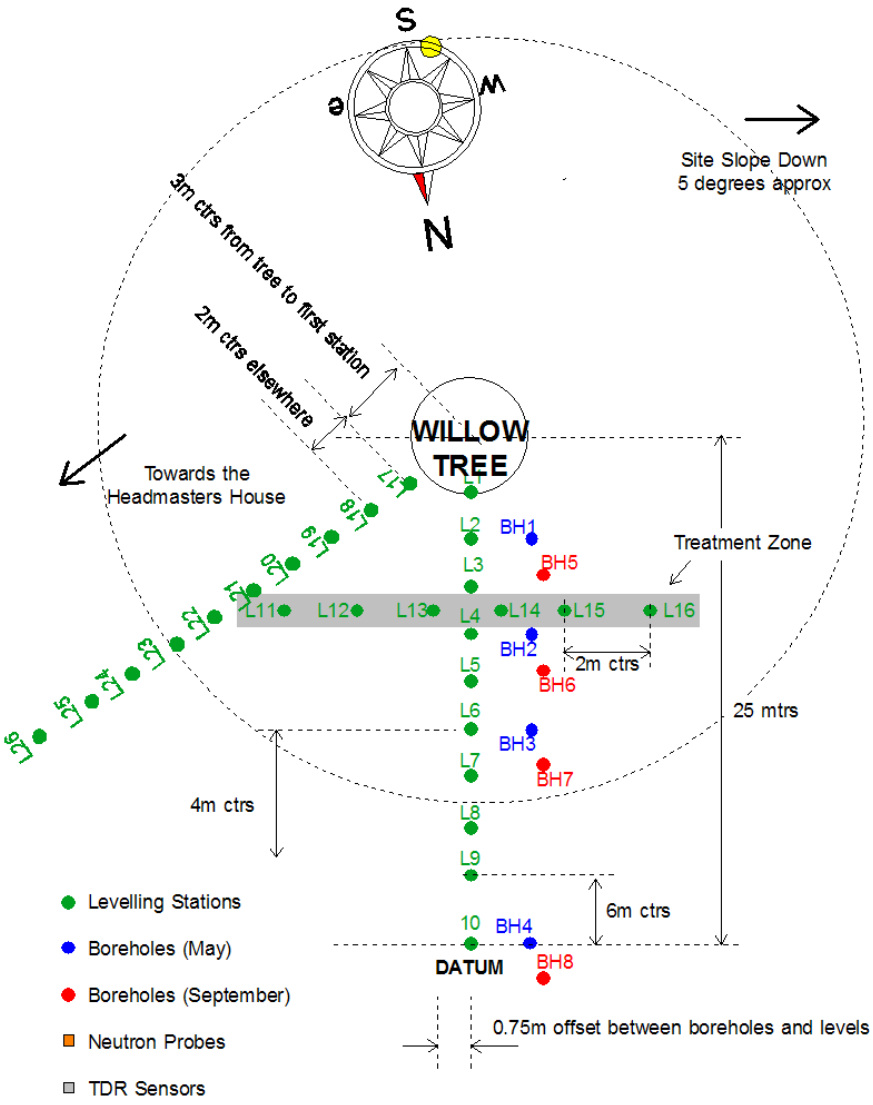
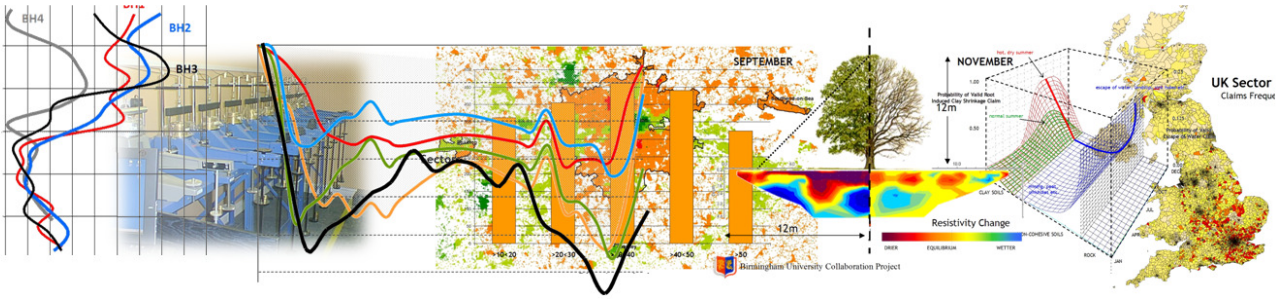
Possible Extension of EKO Research Program in 2016



The existing level stations may be a target for further EKO treatment to understand the response both in the area of treatment and beyond. In theory EKO treatment will stabilise the soil at (possibly isolated) treated stations and shrinkage/swelling should be minimal. How will the level stations distant to the treatment zone respond? The benefit here is the ability to compare the effect with historic readings.



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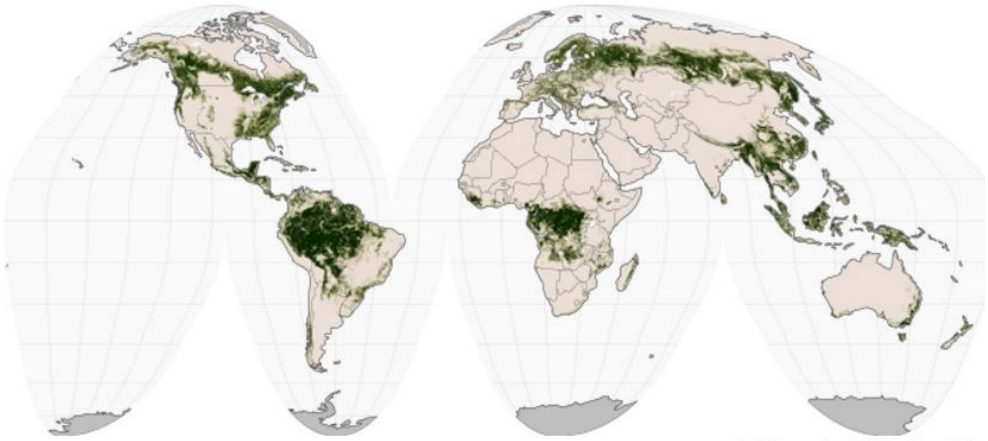
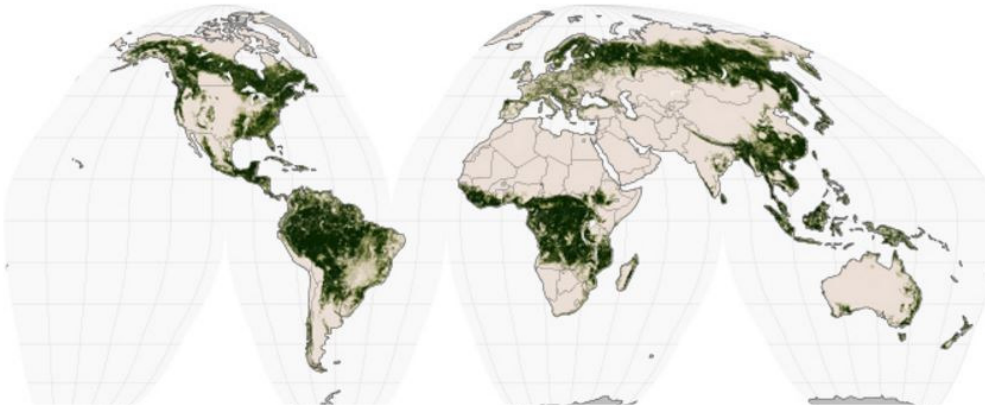
Forests - Growing or Shrinking?

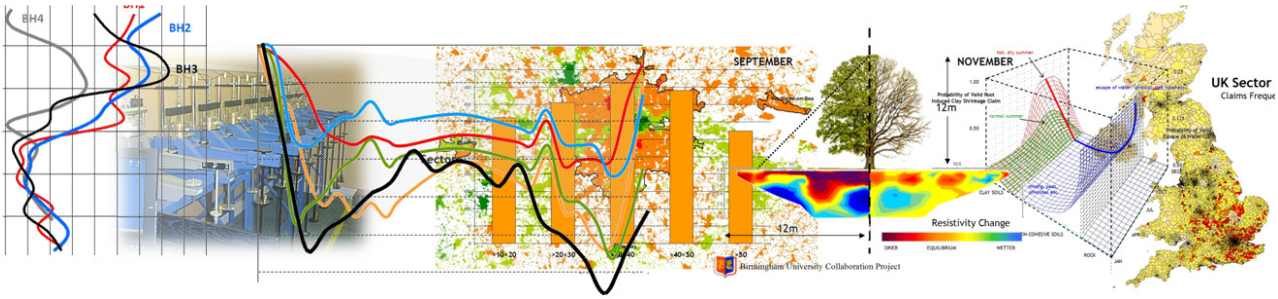
The answer seems to be, we don't know. According to NASA it's difficult to know as much depends on resolution and interpretation of the imagery and below they produce the evidence.





Both pictures are based on data acquired between December 2000 and 2009. The upper one suggests a shrinking area of woodland in several locations (South Africa is probably the easiest to see in the example) whilst the lower one shows a much larger area.

This isn't unique to forestation of course. Ambiguity and interpretation exist across all areas of data collection and interpretation and sometimes it may be influenced by what you hope to find.



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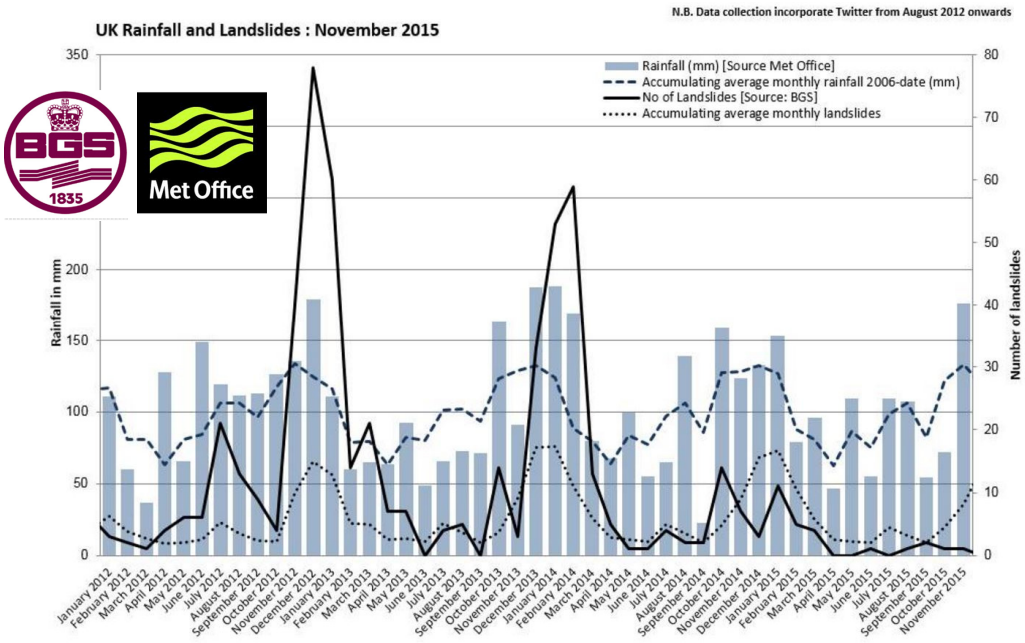
The BGS Record of Landslides using Twitter and Correlation with Rainfall.

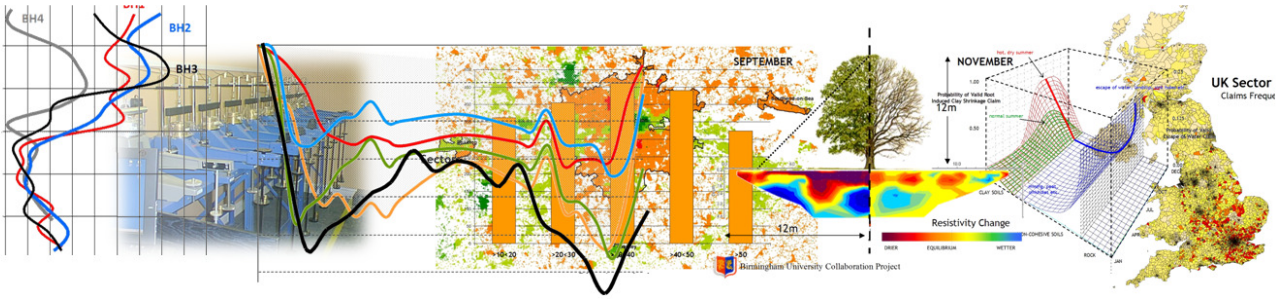
http://www.bgs.ac.uk/research/engineeringGeology/shallowGeohazardsAndRisks/landslides/landslidesAndRainfall.html

Katy Freeborough from the BGS presented the graph at the Aston Subsidence Conference in 2013 and the records have been maintained and extend to November 2015. The updated version of the graph (below) plots the relationship between rainfall and landslides and can be found at the BGS web site - address shown above.



Identifying landslide activity has been made a lot simpler by the use of social media, Twitter. The BGS have been using this means of notification since 2012 with great success.

They report *" Tweets are mainly in response to events that have an immediate impact on society, such as travel disruption, which are often small slope failures. Previously, these small events would not be as visible in the regional and national media and would therefore have a much lower likelihood of being recorded in the National Landslide Database"*



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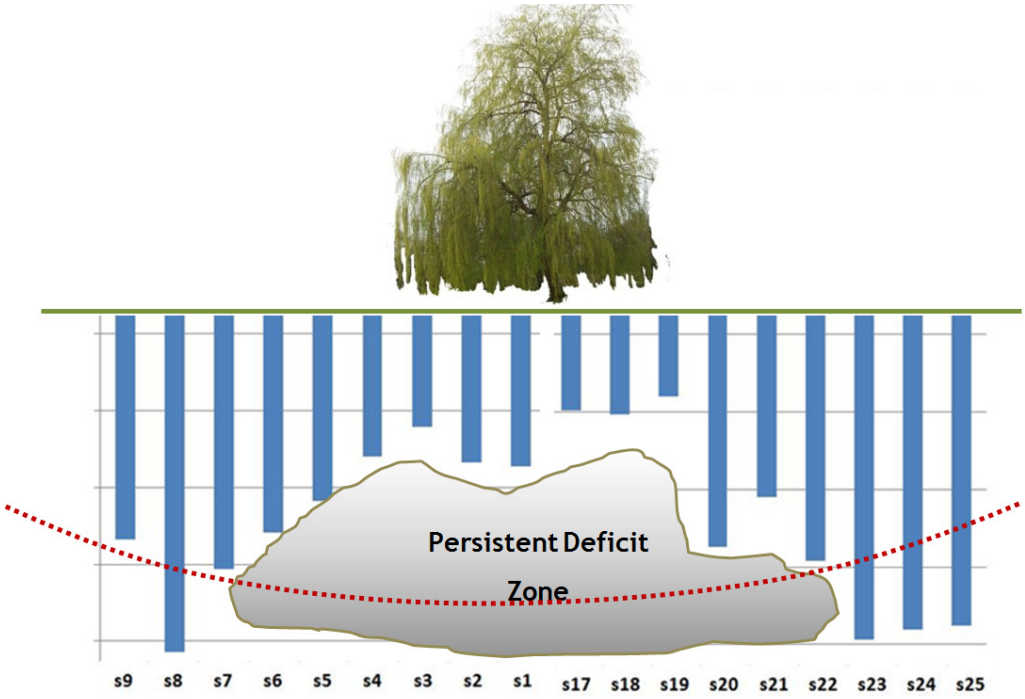
Maximum Ground Movement over 9 yrs at Site of Aldenham Willow

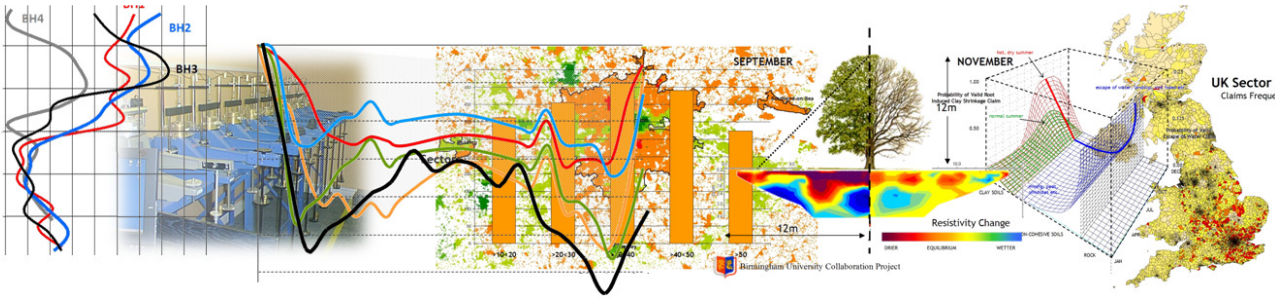
Maximum Recorded Ground Movement Beneath the Aldenham Willow since Monitoring Commenced in 2006

Recording the difference between the minimum and maximum readings, by station, over the last 9 years. Most movement has taken place at Station 8, exceeding 70mm. Stations 23,24 and 25 followed.



Persistent Deficit - Modelled Zone.

Site Investigations at different times and covering a range of seasons have confirmed the presence of a persistent deficit directly beneath the willow which accounts for the reduced ground movement recorded in this location. The image above plots the general location and lateral extent and the inference is that peripheral roots are required to satisfy water demand in the absence of a replenished supply closer to the tree. The red dotted line suggests the possible profile of ground movement in the absence of a deficit.



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Looking back on 2015

It's been a difficult year for adjusting practices with fewer claims and a demand for increased standards following a critical report from the FCA. The year will be remembered not so much for claims but for mergers and acquisitions as insurers re-define their requirements leadings to extensive panel reviews. The FCA was critical of the time taken to carry out first visits and service standards in general. They also highlighted the need to offer easier access to the tech-savvy homeowners who might prefer to use E-mails etc., to notify claims and perhaps have access to claim progress using web based applications.

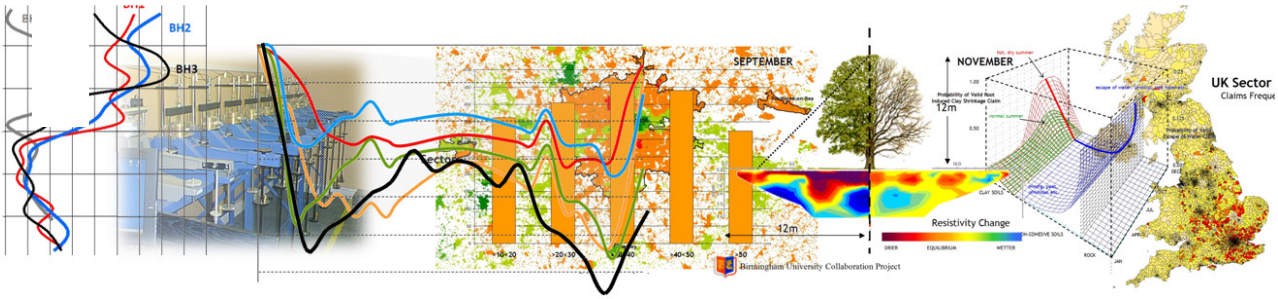
The Aston Conference reflected this with around half of the speakers covering business approaches and the remainder, current research projects, some of which are described in this edition.

In the course of the year we published articles from Richard Driscoll (March and April editions) and Peter Osborne (July edition) explaining their background and involvement in domestic subsidence.

Richard recollected his time at the BRE following his appointment by Prof. John Burland. Most of the current methods are based on the work of Richard and his team. The reduction in underpinning and piling and a more structured approach to investigations including soil testing and monitoring are the cornerstone of modern practices.

Peter explained the role of the Council Tree Officer and the difficulties faced when presented with complex geotechnical and engineering reports. It was clear to him that more needed to be done to bring the various parties (insurers, adjusters and arborists) together. He favours level over crack monitoring as technical evidence but has reservations about the legal framework which he feels works against tree owners.

Over the year, the CRG have produced graphs and articles exploring data relating to the subsidence peril including comparing the high risk postcodes of North London with the UK average, correlating weather elements, comparing the risk of subsidence in major cities and towns and examining the risk posed by various clay soils both by geological series and shrink/swell characteristics.



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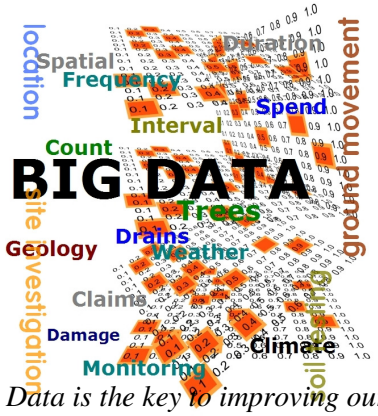
Looking back on 2015 ...*continued*

Weather has been a recurring theme throughout the year as well as reporting on research relating to tree physiology and exploring satellite imagery in relation to monitoring ground movement and mapping the risk of domestic subsidence.

We have been busy supporting research in several areas. Stabilising plastic soils using the EKO technique, re-visiting electrical resistivity tomography as a means of measuring moisture change below ground and dissemination the findings via the Aston Subsidence Conference.

Going forward we continue our work on AI. Does it have a role in claims handling? If so, exactly where does it fit? There are concerns around automated call centre approaches to claims handling, and rightly so.

Whether handled by engineers, robots or computers the central proposition is that as an industry we must have the knowledge to deliver good quality service and understanding the topic is essential.



Data is the key to improving our understanding of the subsidence peril and codifying it

In November we carried out an initial review of IBM's Watson Analytics application. Hopefully a more detailed analysis will follow. We continue to refine our risk model which has applications both for the AI project but also for use in Triage.

Claim numbers may be on the downward trend but we must look to a future where claims are handled in a different way. The FCA are pushing for homeowners to notify claims using computer systems. Specialist adjusters already have access to systems that determine geology, the location of nearby trees, nearby claims and it would be a simple step to ask homeowners to upload pictures of the damage to the claim handlers web application for a meaningful conversation to take place without the need for a site visit in some instances.

'Good service' may mean a less intrusive claims handling approach in 2016 and beyond with greater customer interaction and intelligent system support.