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Improving the effectiveness and safety of mine detection

Geographer Professor John Dearing has led a research project which has mapped the magnetic properties of soils across England and Wales for the first time. This work is assisting the Ministry of Defence in creating specifications for new mine detectors.

Key words: conflict; security; defence; land mines

Land mine clearance across the world is being helped by research undertaken by a team of researchers led by geographer Professor John Dearing from the University of Southampton.

Around every 30 minutes a landmine explodes somewhere in the world with an estimated 7000 people killed or severely injured each year. Landmines hold entire communities hostage: they render agricultural land useless, prevent food and medical aid from reaching people in need, hinder the return of displaced families to their communities, and hamper already difficult relief operations and reconstruction efforts in many affected countries.

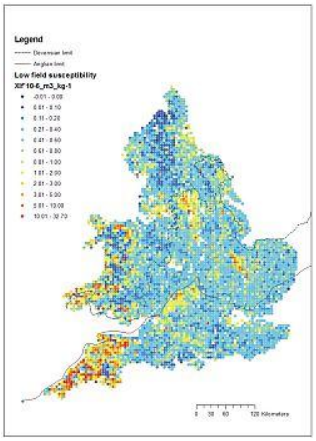
Although landmine use in the past decade has been significantly reduced, and their use banned by the United Nations, around 80 countries worldwide are still affected by an estimated 50 million unexploded mines.

Internationally there is a large amount of on-going work to detect and clear landmines. Electromagnetic induction is the dominant detection method for the UK Ministry of Defence (UK MOD) and international humanitarian organisations. The problem of using this method is that soil itself has magnetic properties, with very magnetic soils producing a signal to the detector similar to that of metal objects, making it impossible to distinguish between landmines and the soil itself.

The research from Professor Dearing's team set out to find a way to distinguish between these signals. The process began with research which mapped the magnetic properties of soils across England and Wales. The work took samples of soil from a variety of locations across the country. It was found that the magnetic properties of soils vary from place to place according to specific local variables related to geology and weather. Reasons for variations in magnetism have not previously been understood.

This work has enabled a mathematical model to be developed which can predict the likely soil magnetism of an area across the country without the need for further sampling. From this new maps of soil magnetism for England and Wales have been published. The soil maps mean the UK Ministry of Defence (MOD) can now find samples of very magnetic earth to be able to test potentially better designs of detectors.

The research is therefore helping in the development of mine detectors that will be more effective in very magnetic soils. The expectation is that a new generation of detectors will lead to a reduction in the high rate of maiming and death amongst mine clearance staff, currently standing at one person for every 2000-3000 mines cleared.



UK Map shows the magnetic susceptibility of top soils across England and Wales: red and yellow colours identify highly magnetic soils that can be used to test mine detector performance.

Professor John Dearing FRGS, University of Southampton. The research was jointly funded by the Natural Environment Research Council and Defence Science and Technology Laboratory. Further details: http://sid.nerc.ac.uk/details.aspx?id=301

NOW Article #26 September2012