What's Happening in...

Environmental and Earth Science

Summer 2014
Newsletter

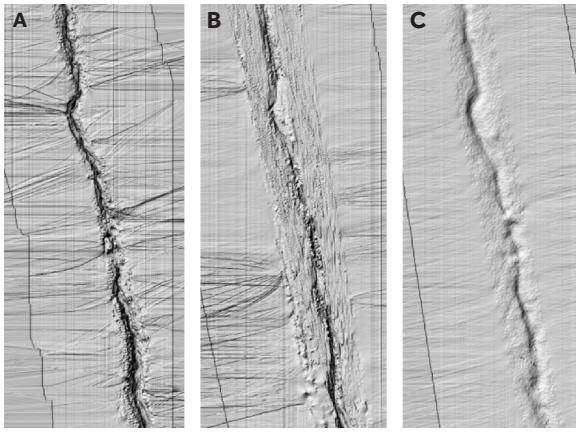
This newsletter describes research that soil scientists in LEC are undertaking as part of developing a national soil erosion monitoring network for England and Wales. The team is working with a range of cutting-edge laser scanning and digital photography techniques to quantify the extent and severity of soil erosion.

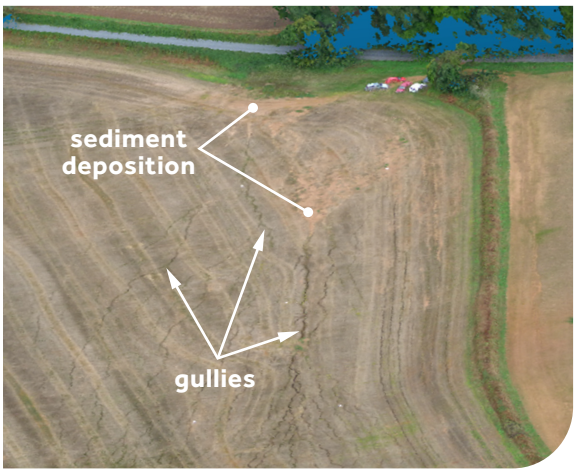
New techniques for **quantifying soil erosion**

Soil is a critical natural resource that supports all life. Human society depends on a number of services that are provided by soil, including food production, protection of water quality and carbon storage. However, many landuse practices can lead to soil degradation, ultimately increasing the susceptibility of soil to erosion. Soil erosion is a key threat to soil functioning and is estimated to cost £45 million annually in England and Wales. Identifying areas currently at risk of soil erosion, as well as quantifying erosional responses to future changes in landuse and climate, are important research challenges.

Researchers in LEC are currently working on a project funded by the Department for the Environment Food and Rural Affairs to develop and evaluate a methodology for use within a national soil erosion monitoring programme. The Lancaster team are comparing a number of new methods for collecting detailed topographic data via remote sensing, enabling dynamic processes such as soil erosion to be studied. These methods include state-of-the-art ground-based laser scanning, alongside construction of topographic data from digital photographs taken either from the ground or from unmanned aerial vehicles. These techniques are used to characterise complex topographic features associated with soil erosion, such as rills and gullies, though the production of high-resolution digital elevation models (DEMs). The DEMs can then be analysed to quantify the severity of soil erosion, for example through estimating the volume of eroded soil associated with particular features. Ultimately, the project seeks to establish which method, or combination of methods, would be suitable for inclusion within a national soil erosion monitoring network across England and Wales.

Students in LEC learn about the process of soil erosion and the approaches to quantifying erosion during soil science modules. A number of students are able to gain direct experience of the techniques detailed in this newsletter during their dissertation projects. This provides our students with training in cutting-edge research techniques and transferable practical skills for future jobs outside the exciting world of research.





Images. **Top:** Terrestrial laser scanner being used to characterise a gully feature associated with soil erosion in an arable field in southwest England. **Middle:** Digital elevation models of sections of the same gully shown in the top image. Model A produced using digital photographs taken from the ground, model B using terrestrial laser scanning, and model C using digital photographs from an unmanned aerial vehicle. **Bottom:** 3D data of the study site derived from aerial photographs acquired by an unmanned aerial vehicle. Areas of sediment erosion (dark channel-like gullies) and soil deposition (light-brown sediment fans towards the top right corner of the field) are shown.

For more details about the reports above or about Earth Science and Environmental Science courses on offer at Lancaster University please contact the Earth and Environmental Science Admissions Staff,

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