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# Combining soils and terrain data for modeling soil moisture

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The aim of this study was to investigate soil moisture variations and how soil and terrain data can be used in combination to explain the spatial variation in soil moisture contents.

Combining soils and terrain information is key to understanding hydrological processes at a landscape scale. Increasing the scale of soil maps has been shown to allow the spatial patterns of soil moisture to be more fully represented in the landscape. However soils data is often only available at reconnaissance scales (eg.1:250,000). There is, however widely available Digital Terrain Models at a 10 m grid resolution. It is widely acknowledged that soil hydrological properties vary within the landscape.

Field monitoring of surface soil moisture content on eight occasions in three different fields was undertaken between April and July in 2004 and 2005. Between 100 and 120 points were sampled in each survey using a Delta-T ML2 Theta Probe.

The results from regression models showed that up to 80% of the variation in surface soil moisture can be explained using 1:10,000 soil series maps. Short wave radiation on a sloping surface calculated by SRAD and the topographic wetness index ($\log(a/\tan\beta)$) combined explained a maximum of 41% of the variation. These variables also explained significant additional variation when combined with 1:25,000 soil series information.