



## **Active Distributed Temperature Sensing for high resolution monitoring of soil moisture and temperature – A field case study**

Giulio Curioni (1), Francesco Ciocca (2), and Stefan Krause (1)

(1) University of Birmingham, School of Geography, Earth & Environmental Sciences, Birmingham, United Kingdom (g.curioni@bham.ac.uk), (2) Silixa Ltd., London, United Kingdom

Soil moisture is a fundamental parameter whose knowledge is required in a wide range of disciplines. Point sensors provide relatively accurate measurements at point locations but are unpractical for studying the spatial variability of the soil moisture. Recent advances with the fibre-optic active distributed temperature sensing technique make it now possible to monitor large areas at an unprecedented spatial and temporal resolution. This study shows the application of the fibre-optic method for monitoring soil moisture and soil temperature within the upper 0.5 m of soil across a 2 ha field recently planted with juvenile deciduous trees. A single fibre-optic cable has been buried at three different depths and heated four times per day providing soil moisture measurements every 0.25 m. The results collected over a period of one year demonstrate the high spatial variation encountered at the field scale. These data provide unique insights into the actual hydrological processes occurring in the soil during drying and wetting events.