



The UK Centre for Ecology and Hydrology (UKCEH) is establishing the first network to systematically measure soil moisture throughout the UK. When fully operational, the network will provide valuable new information showing how soil moisture varies across the country with soil type, climate and vegetation.

Each of our monitoring sites is equipped with a sensor that exploits cosmic-rays to measure soil moisture over an area of up to 40 hectares (about 100 acres). The widespread deployment of this state-of-the-art monitoring technique gives the network its name: the Cosmic-ray Soil Moisture Observing System UK, or COSMOS-UK for short.

The primary objective of COSMOS-UK is to deliver soil moisture information in near-real time to support a wide range of scientific and business applications. Used with meteorological and hydrometric observations, the new soil moisture measurements will enable us to better describe current environmental conditions and inform management decisions relating to water resources and agriculture. Integrating the data in models will enhance predictions of, for example, flood events and crop yields. The data will also enable a step change in fundamental science associated with land-atmosphere interactions, including greenhouse gas emissions from soils.

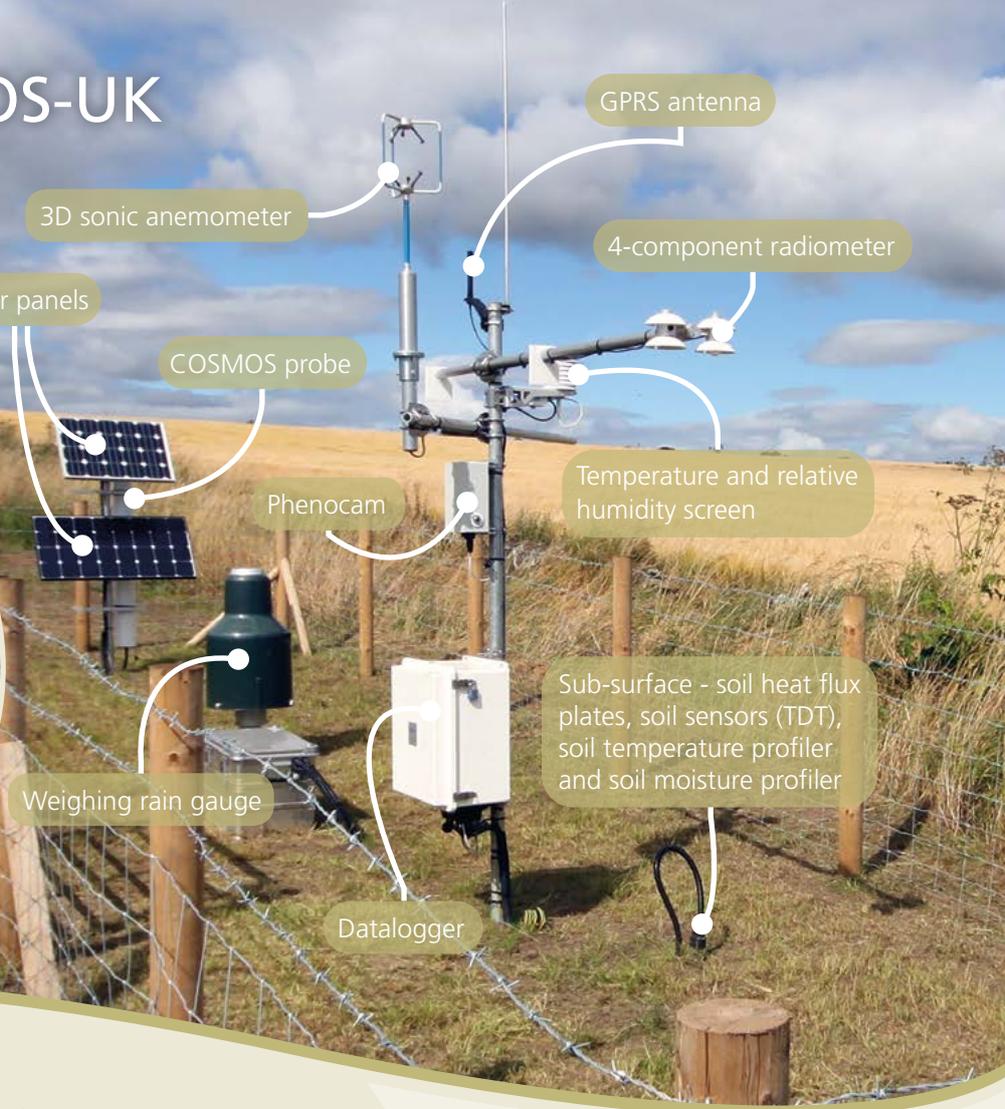
“ COSMOS-UK is only possible because of the financial support of NERC and the expertise of UKCEH scientists ”



Revolutionising the way soil moisture is measured across the UK



A typical COSMOS-UK monitoring site



All COSMOS-UK sites are equipped with a range of research-quality meteorological and soil monitoring instruments.

An automatic weather station provides temperature, humidity, atmospheric pressure, wind speed and wind direction, and this is complemented by a weighing rain gauge and a radiometer measuring long and short wave, incoming and outgoing radiation.

Below ground, instruments measure soil moisture, temperature and heat flux. These point measurements quantify the variability of soil moisture with depth through the soil profile, and are complementary to the data derived from the cosmic-ray soil moisture sensor.

All instrumentation is designed to operate remotely with minimum maintenance, and return the data automatically to UKCEH at Wallingford for quality control, archival and dissemination.

Main image - COSMOS-UK site at Balruddery.

Inset: This is a "phenocam" image from the Balruddery site. Each site has two cameras providing a time-series of photographs of the landscape in which the COSMOS-UK site is located. The images are most useful in providing information on seasonal changes in vegetation.

All photos UKCEH.

