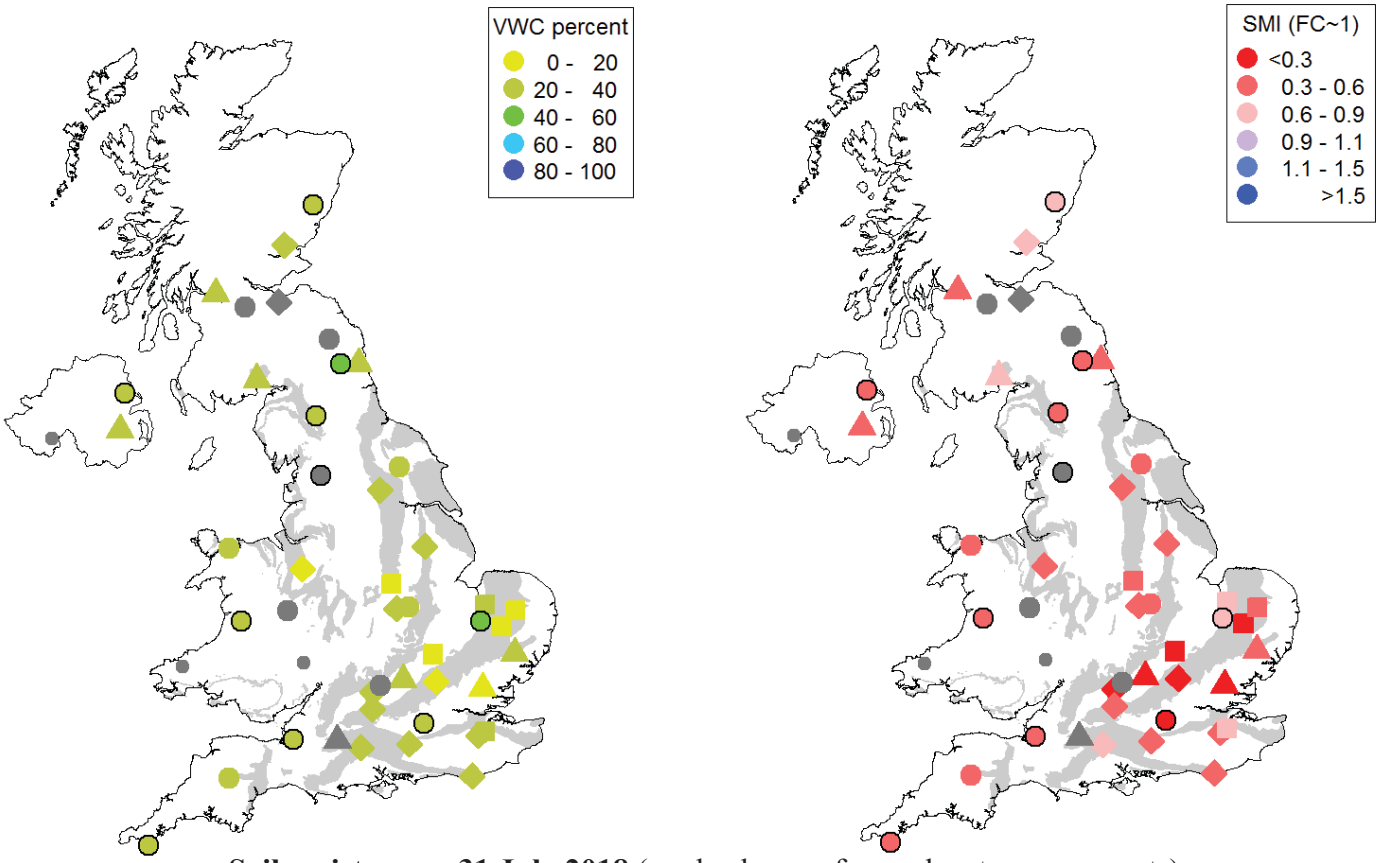
COSMOS-UK | soil moisture

UK Soil Moisture Monitoring Network

Issued on 1 August 2018



Soil moisture on 31 July 2018 (see back page for explanatory comments).

Notes on period to 31 July 2018

Soil moisture at the end of July is low across the UK and at some locations vegetation is stressed. On July 31st soil moisture has recovered somewhat, but this recovery may be short-lived in the south with the forecast return of high temperatures and little prospect of rainfall.

Provisional data for July indicate that rainfall was below normal across most the UK, the exception being Northern Ireland where rainfall was close to normal. In south-east England rainfall was roughly 50% of average. The rain that did fall was mostly towards the end of the month. July was generally hot and sunny with temperatures exceeding 30 °C at several COSMOS-UK sites. Associated with the high temperatures were high rates of evaporation.

Low rainfall and high evaporation drove further falls in soil moisture. Many sites to the south of the UK have seen very little rainfall since the thunderstorms at the start of the June, since when soil moisture has fallen to notably low levels, and with only a very slight recovery at the end of July (e.g. Rothamsted, Chobham Common, Loddington, North Wyke); at other sites the recovery has been to more normal values (e.g. Morley, Porton Down, Stoughton, Lullington).

The drying of soils has also been notable at some of the upland sites with peat soils (e.g. Moor House, Plynlimon).

Further north, there have been periods during which soil moisture has fallen rapidly, but also recovered somewhat in response to rainfall (e.g. Balruddery).

The maps of soil moisture index and volumetric water content on July 31st show that soil moisture is low across the UK, albeit with some local variability.

Note that the COSMOS-UK records are too short to reliably estimate long-term monthly averages and departures from them; it is therefore only possible to give qualitative indications about averages and what is typical for the time of year.

Technical issues during July

Telemetry:	Cwm Garw, Gisburn, Hartwood Home, Sourhope
Logger:	Glenwherry
Cosmic ray neutron sensor:	Henfaes (data will be recoverable), Heytesbury
Raingauge:	Bunny Park, Chimney Meadow, North Wyke, Morley, Stoughton, Waddesdon
Minor issues:	Bickley Hall, Balruddery, Easter Bush, Euston, Porton Down, Stiperstones, Waddesdon

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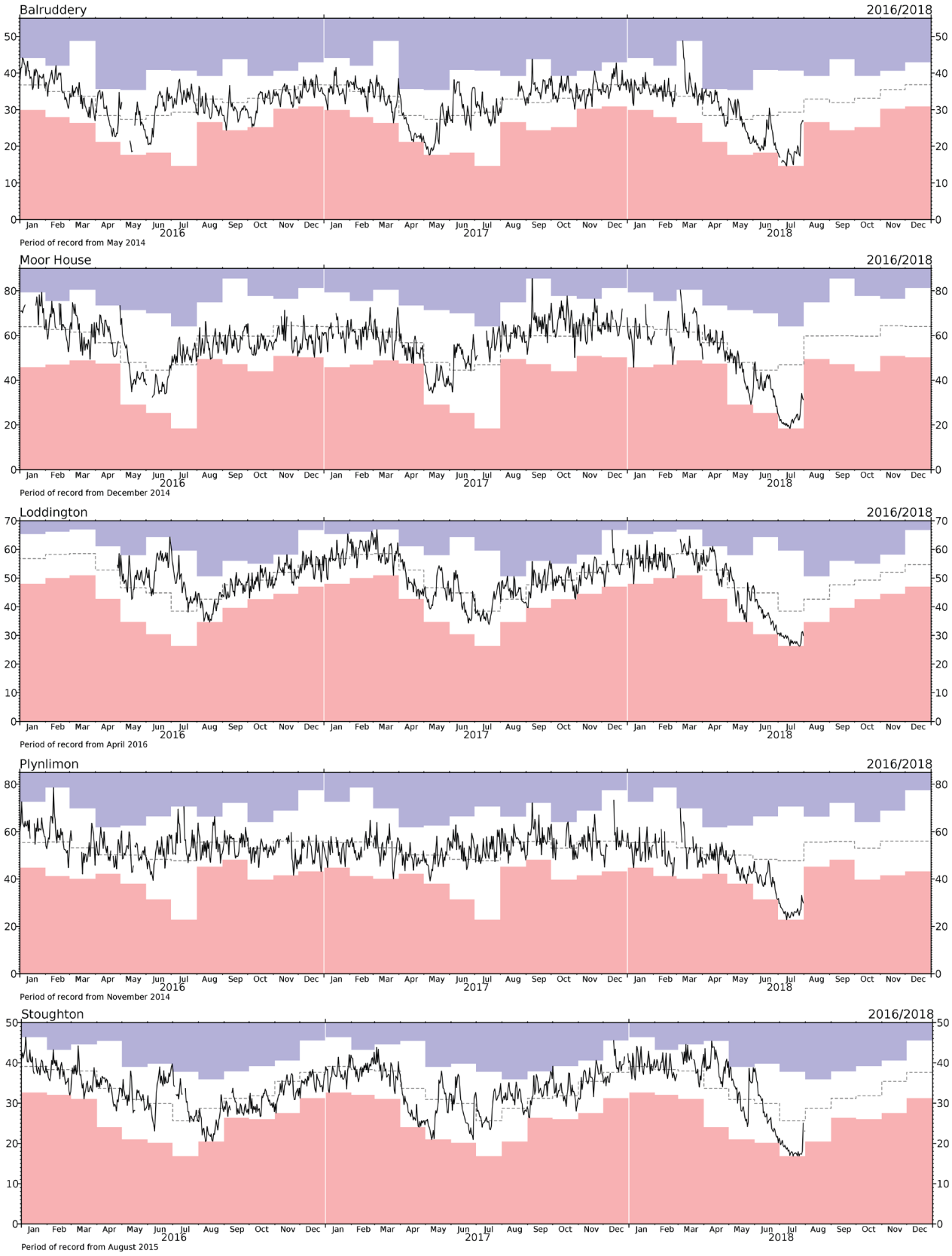

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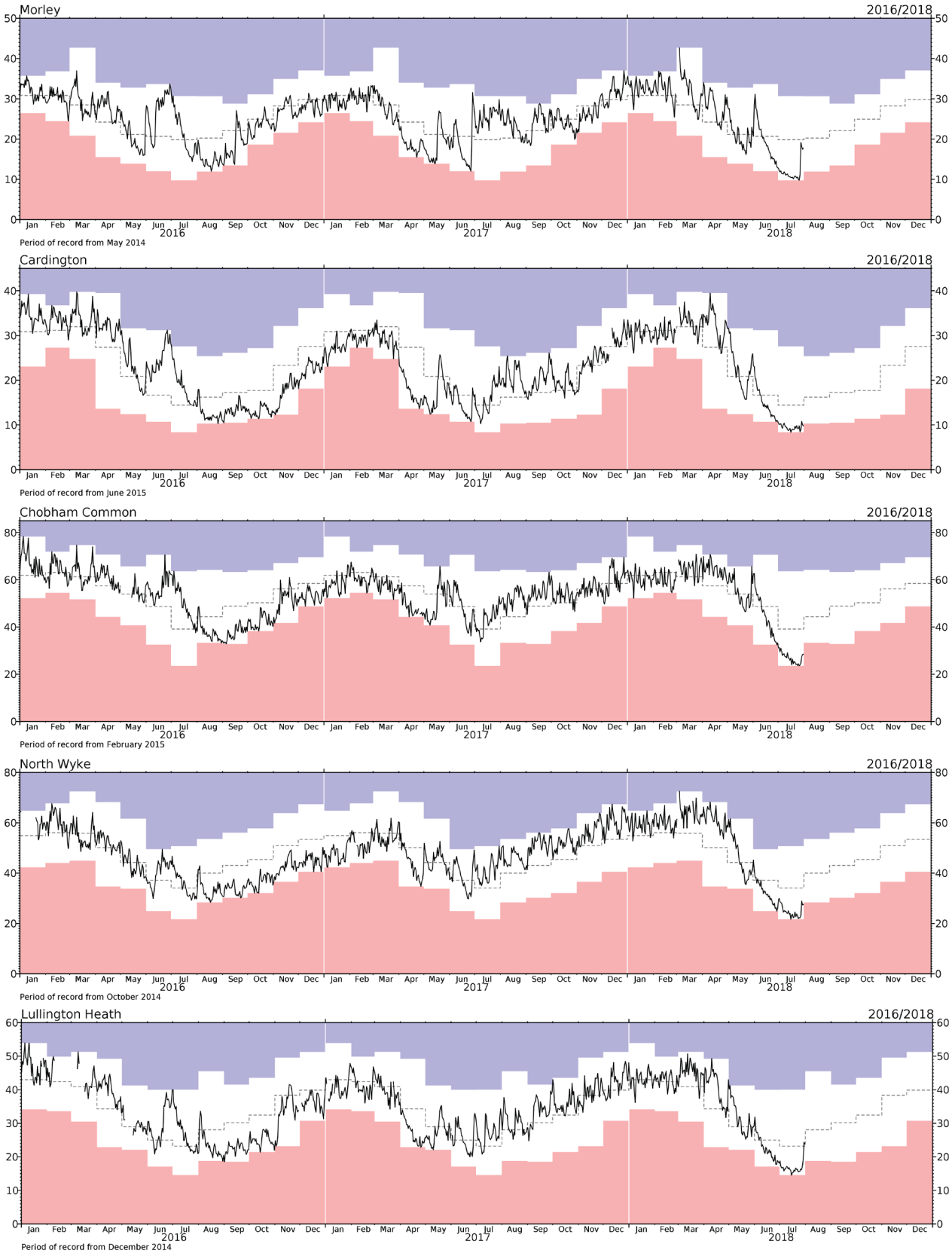

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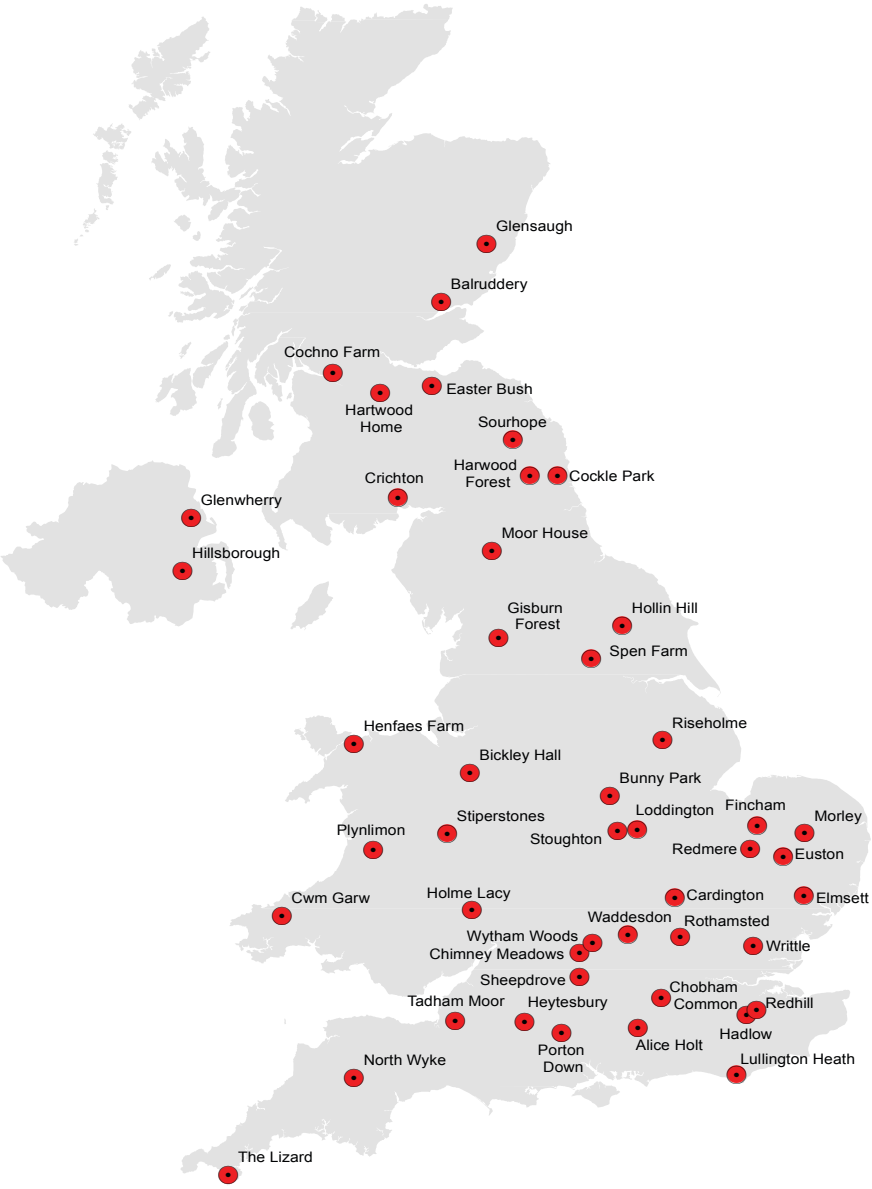
COSMOS-UK site locations



About the maps on page 1: The maps of volumetric water content (VWC) and soil moisture index (SMI) show average daily soil moisture at the end of the month. Colours indicate wetness as in the keys. Grey symbols represent missing data.

The symbols represent groups of sites with similar soil maximum water content, i.e.

~ 30%	■
~ 40%	◆
~ 50%	▲
~ 60%	●
>=~ 70%	●

VWC – This is the percentage water content and reflects both capacity of the soil to store water as well as actual moisture content.

SMI – This is an index of soil moisture that is adjusted for the capacity of the soil to store water. A value of around 1.0 represents field capacity (FC) which is typical moisture content in late autumn and early spring. SMI will generally be lower than this in the summer and higher in the winter.

Nearby sites with the same symbol (i.e. similar rainfall and soils) should be in similar VWC and SMI classes; however neighbouring sites with different symbols (i.e. similar rainfall but different soils) can be in different VWC and SMI classes. Sites represented by circles with an outline are generally poorly draining and wet, and therefore often have VWC and SMI values different from their neighbours; data from these sites are less reliable than from other sites.

The shaded areas represent principal aquifers.

About the graphs on pages 2 and 3: These show the VWC over a three year period. The black line shows the daily soil moisture, the shaded areas show the monthly minima (pink) and maxima (blue) from the period of record, and the dashed grey line indicates the period of record monthly mean. These extremes and means are currently derived from very short records; they do nevertheless give some indication of the seasonal variability of the moisture content.

About soil moisture: Soil moisture varies in the short term (hours to days) with rainfall and as water drains through the soil. Longer term variation is driven by the seasonal difference between rainfall and evaporation. Thus soil moisture decreases in the summer when evaporation exceeds rainfall but increases when this is reversed. In most winters under UK conditions, soil moisture reaches a relatively constant value, known as field capacity; additional rainfall either cannot enter the already saturated soil and flows across the land surface as overland flow, or infiltrates but drains quickly through the soil.

Differences in soil type and weather patterns cause variations in soil moisture between sites including when the soil returns to field capacity in autumn/winter and when soil moisture decreases in the spring/summer.

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