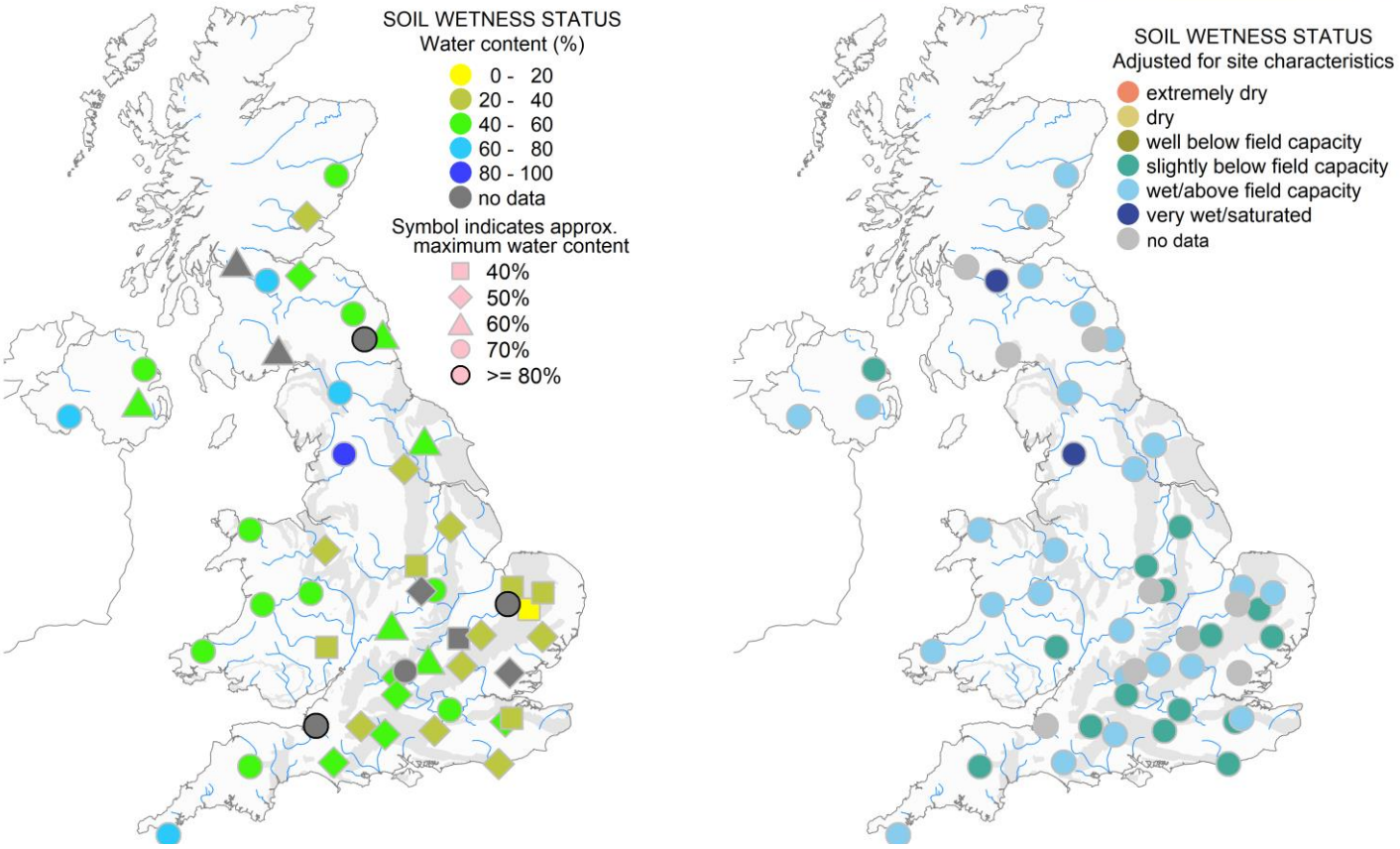
COSMOS-UK | soil moisture

Issued on 11 December 2025



Soil moisture on 30 November 2025 (see back page for explanatory comments).

November saw above-average rainfall throughout the UK, leading to continued increases in soil moisture across all COSMOS-UK sites.

Provisional data indicates that the monthly rainfall in November was 31% above the long-term average for the UK, continuing the trend of the wet conditions throughout Autumn months. Central and Eastern England was particularly wet, seeing around 194% of its average rainfall. The month brought variable temperatures, with a particularly warm first half, dropping below freezing in some areas of the country in the second half, which brought the first snowfall of the year around the 19th.

COSMOS-UK sites show that the sustained wet weather has continued the recovery in soil moisture across the network. The North-South divide, seen earlier in the autumn, has begun to diminish, with previously drier sites in the south (e.g. Alice Holt, Riseholme, and Chobham Common) continuing a recovery in their soil moisture levels. Overall, 38 sites (88% of the network) measured conditions that are normal, or wetter than normal, for the time of year. A small number of sites (e.g. Elmsett, Glenwherry, Heytesbury) remained drier than expected despite the widespread rainfall. The solar storm at the start of November was detected in the recorded neutron counts across the network, particularly in northern sites – we are investigating the potential effects of this on the COSMOS volumetric water content calculations.

Overall, November's above-average rainfall helped replenish soil moisture across the UK, although the significant drought over the summer can still be felt through the remaining drier than normal sites.

Network news

Restructuring of the network continued this month. Sampling for the calibration of instruments at Redhill and visits to Waddesdon and Stoughton were made for maintenance and decommissioning.

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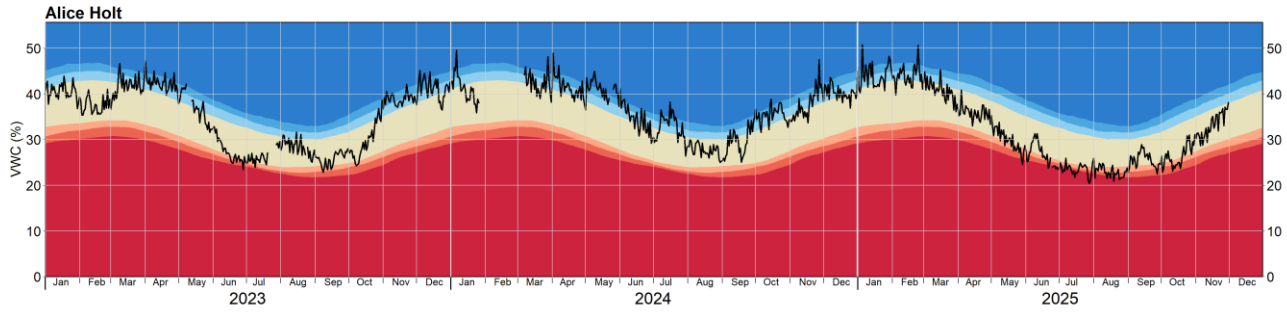

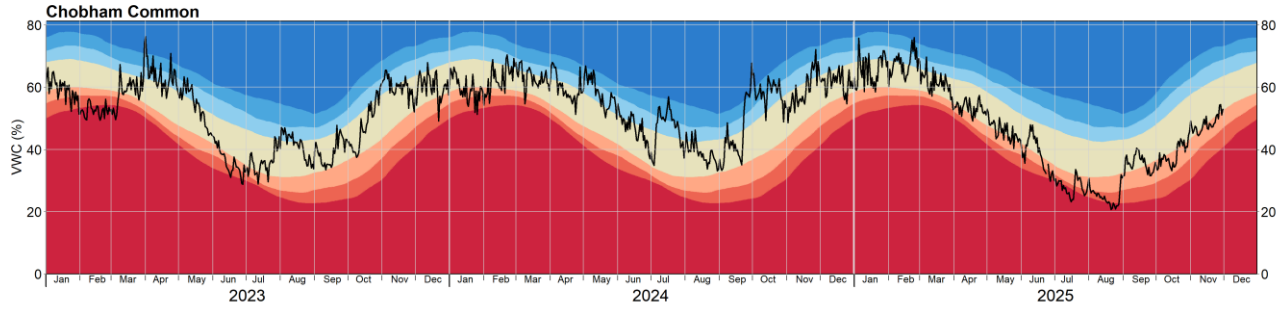

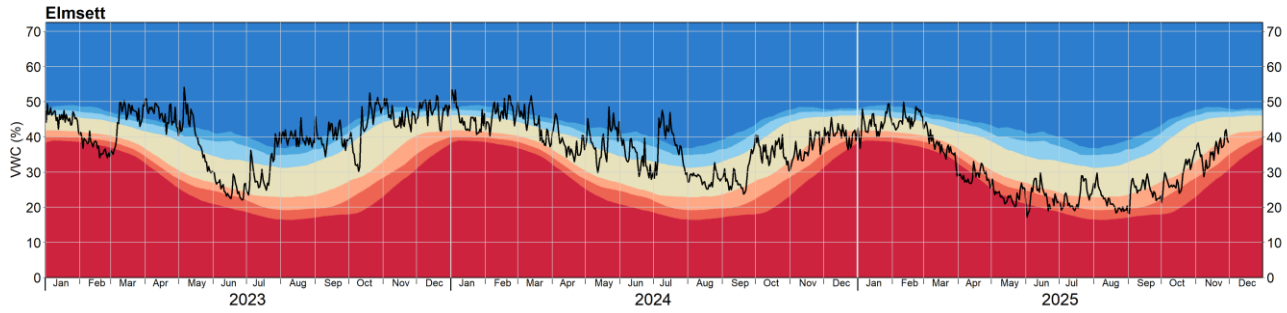

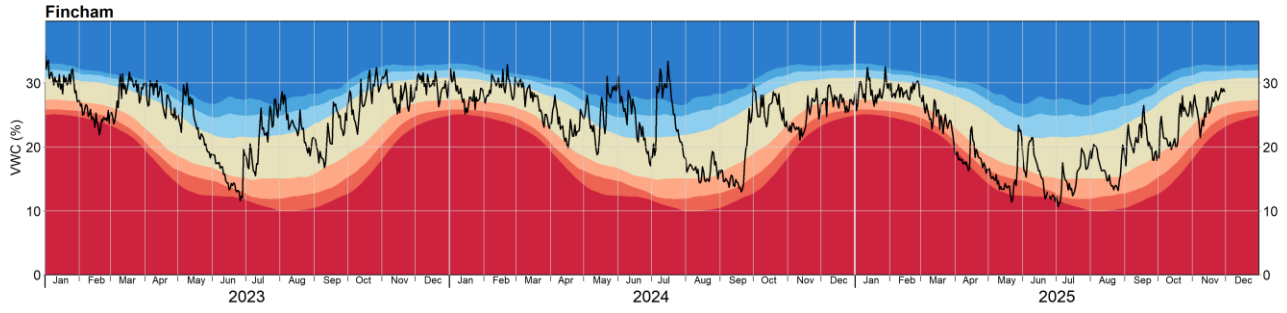

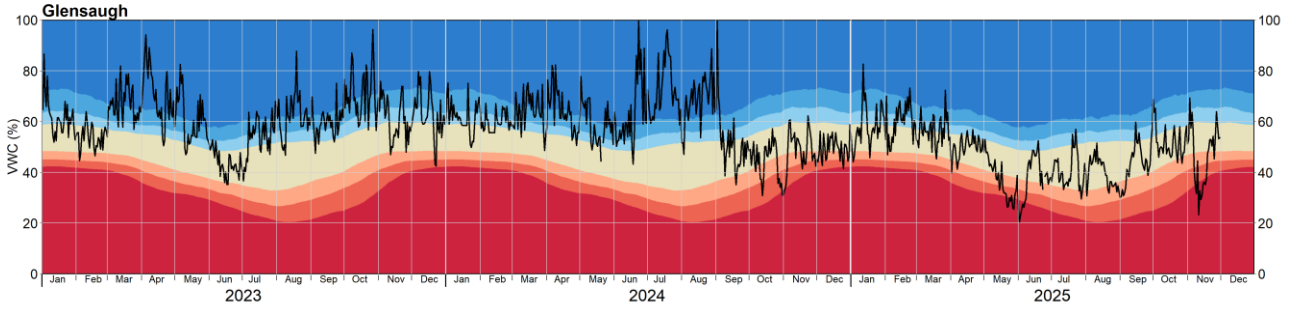

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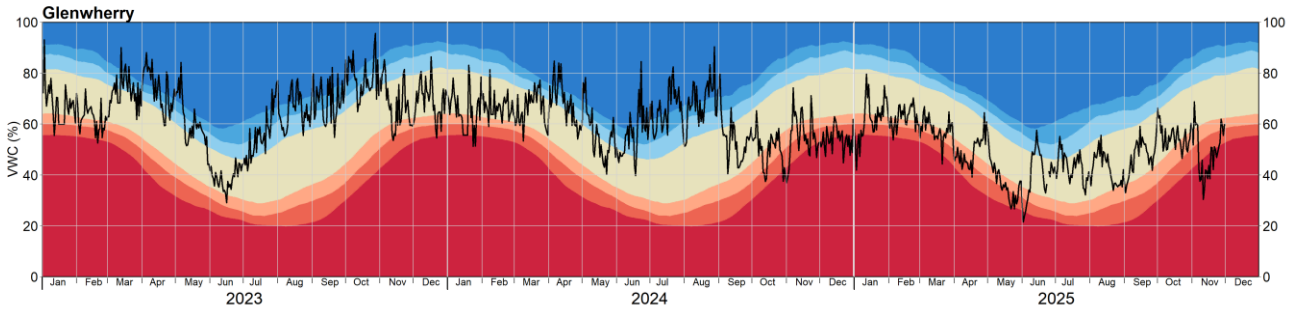

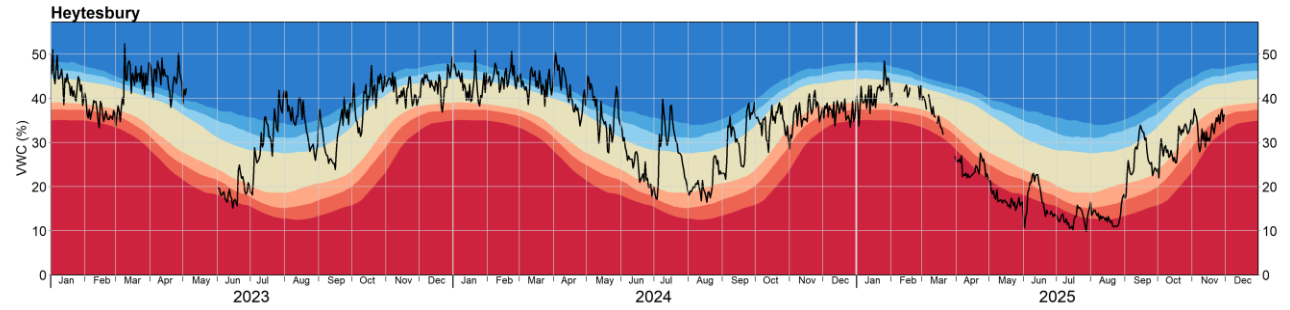

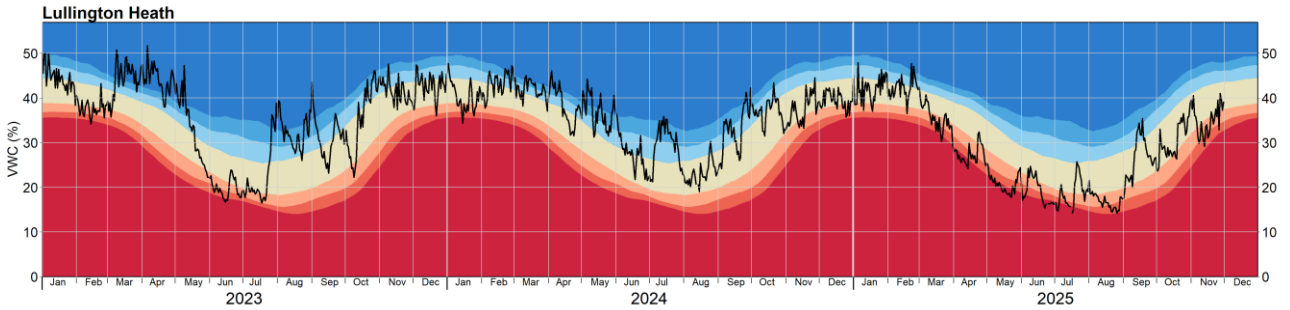

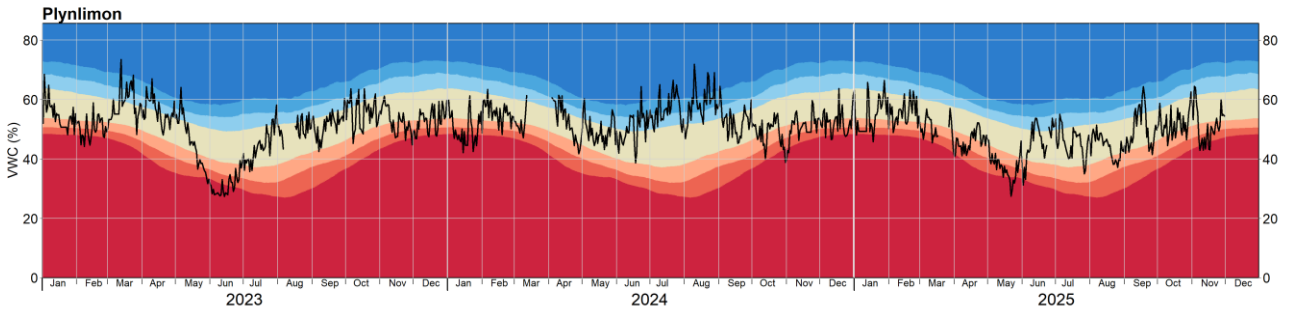

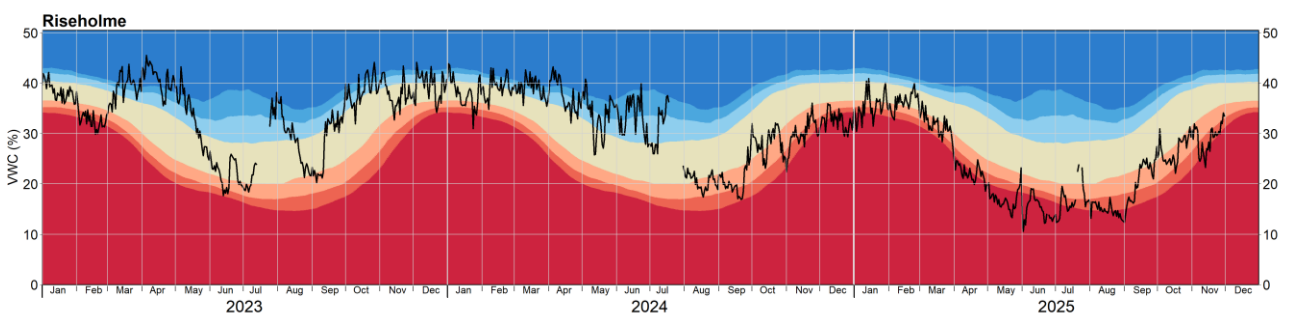

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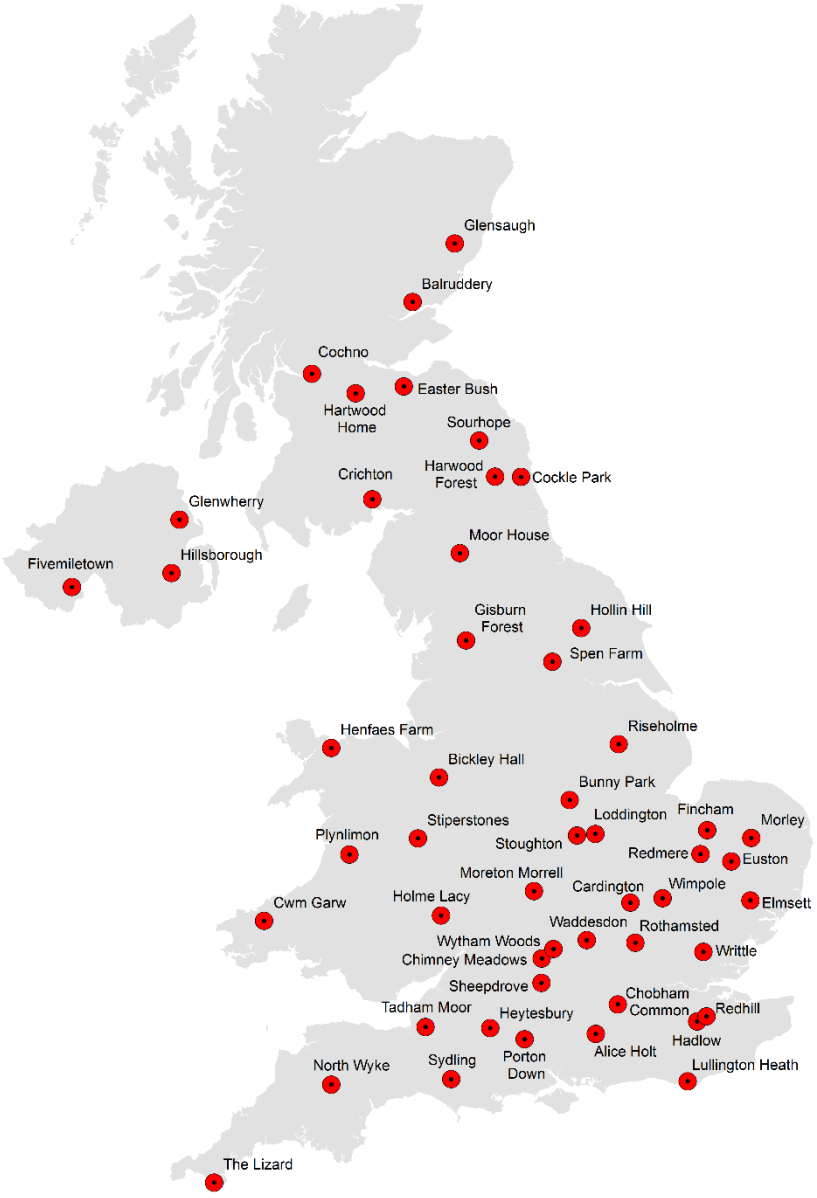

About the maps on page 1: The maps show daily mean soil moisture on the last day of the month. Colours indicate wetness as in the legends.

The map on the left shows wetness as the volumetric water content (VWC) of the soil which is constrained by soil type, i.e. some soils are able to hold more water than others as indicated by the shape of the symbol.

The map on the right presents soil wetness adjusted for site specific characteristics, i.e. taking account of the possible range of soil wetness at each site. Field capacity (FC) is a key point in this range. When soil moisture is below FC soil moisture is said to be in deficit, i.e. there is a (positive) soil moisture deficit (SMD).

Grey shaded areas on these two maps represent principal aquifers.

About the graphs on pages 2 and 3: The black line shows VWC. The coloured bands indicate how VWC compares to historical variability for the site and time of year.

- exceptionally dry
- notably dry
- drier than normal
- normal
- wetter than normal
- notably wet
- exceptionally wet

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 the field capacity. Field capacity is a measure of how much water the soil can hold against gravity and is strongly dependent on the soil type. Soils are expected to be around field capacity after being wetted to above field capacity and the excess water (e.g. from macropores) has drained away under gravity, which can take several days after heavy rain, to reach a near steady state. 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.

About COSMOS-UK: COSMOS-UK is supported/partially supported by NERC, through the UKCEH National Capability for UK Challenges Programme NE/Y006208/1.

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