

Soil moisture on 28 February 2023 (see back page for explanatory comments).

Notes on period to 01 March 2023

February was a very dry month across much of the UK, with many COSMOS-UK sites seeing a drop in soil moisture from the previous month.

Provisional data for February indicate that precipitation amounts were well below average across much of the UK, particularly in England, Wales, and Northern Ireland. In Scotland, precipitation amounts were average for the month in Northern Scotland, whereas Southern and Eastern Scotland were below average. The Met Office reports that the UK as a whole saw less than half its average precipitation for the month. February was a mild month, with temperatures between 1-2°C higher than average for the time of year.

Soil moisture varied considerably across the COSMOS-UK network. Sites in northern England and Scotland were generally within or above their normal range, with very wet conditions at Hartwood Home. Sites in Wales, eastern and southern England were drier, for example The Lizard and Elmsett experienced very dry conditions. Despite below average precipitation, some sites across central England and Northern Ireland maintained soil moisture in their normal range, for example Chimney Meadows and Fivemiletown.

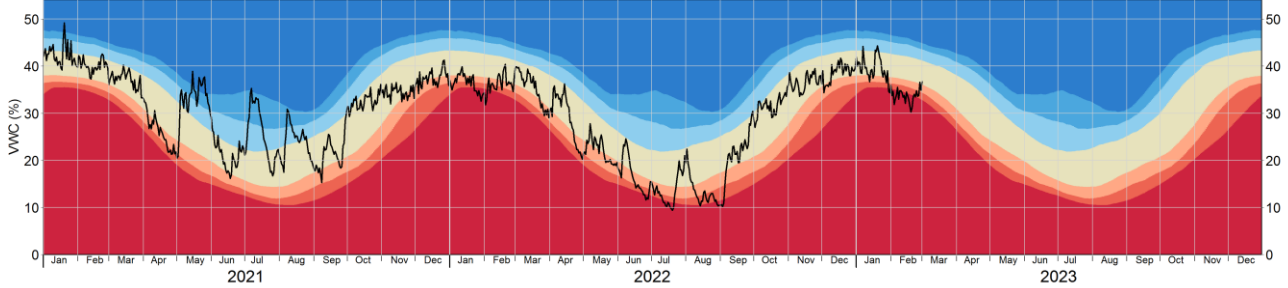
Overall, soil moisture declined from the previous month at most sites. The soil moisture conditions generally reflected the regional precipitation status, with low soil moisture levels in regions that received below average precipitation during the month.

Network News

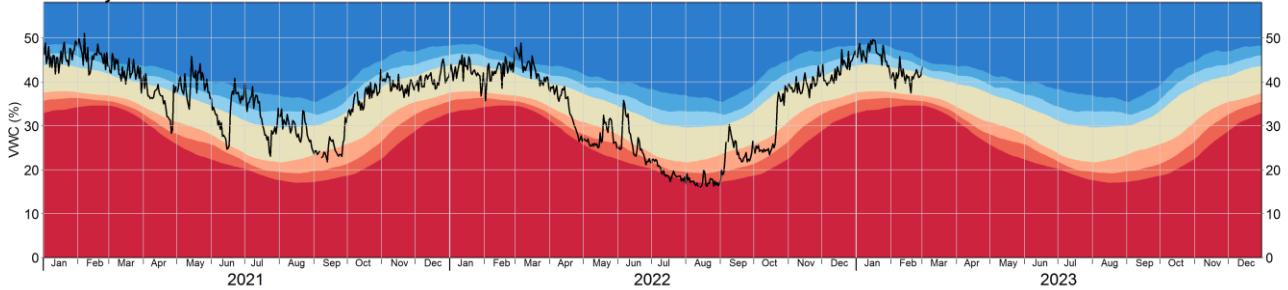
The relative humidity and temperature sensor was replaced at Cwm Garw, allowing VWC calculations again. Historic surface pressure anomalies have been identified and fixed at Hollin Hill, with reprocessed VWC data now available.



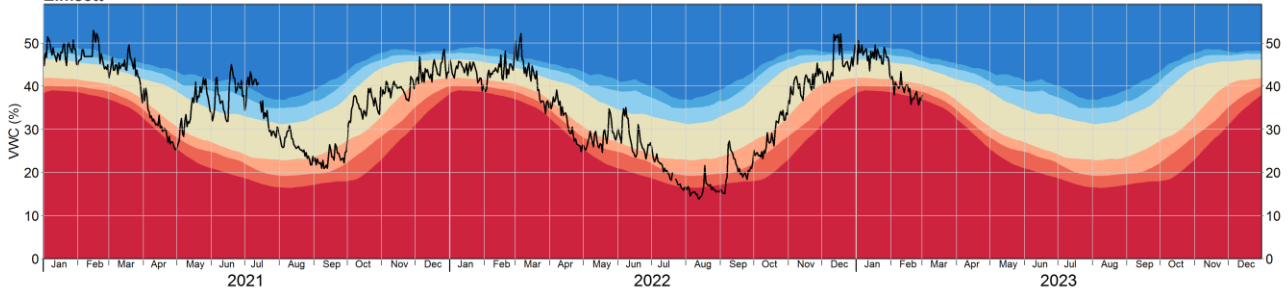
Bickley Hall



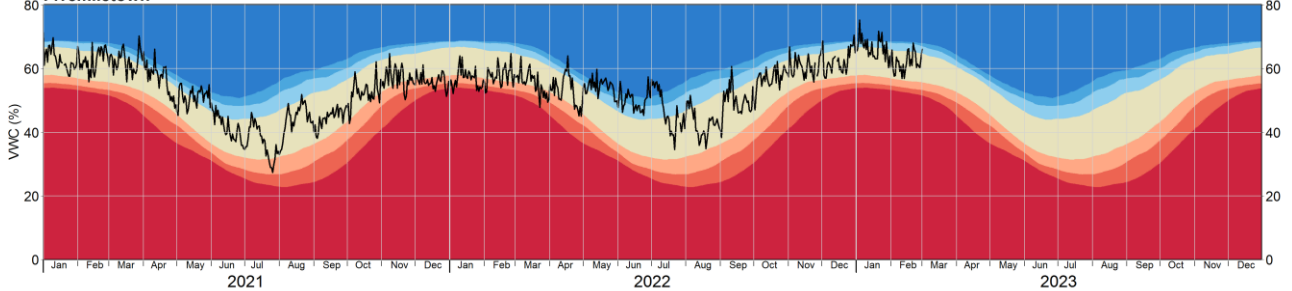
Chimney Meadows



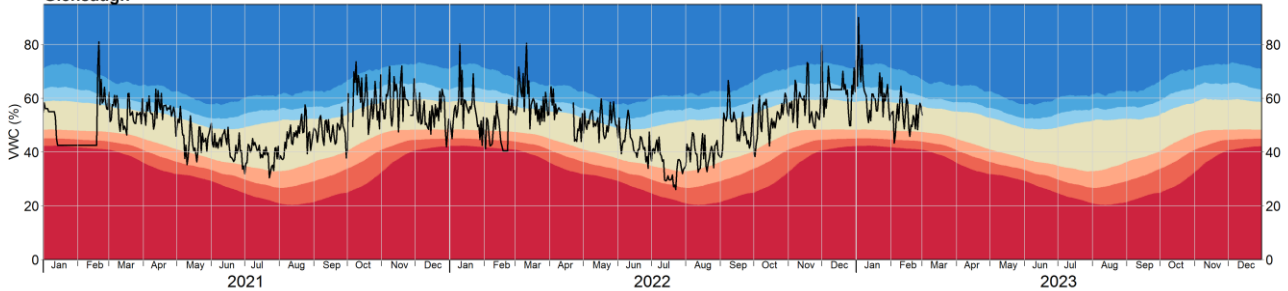
Elmsett



Fivemiletown

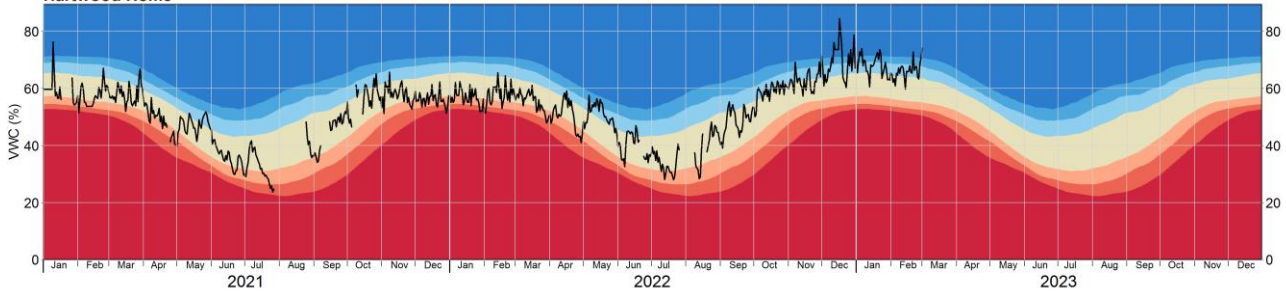


Glenshagh

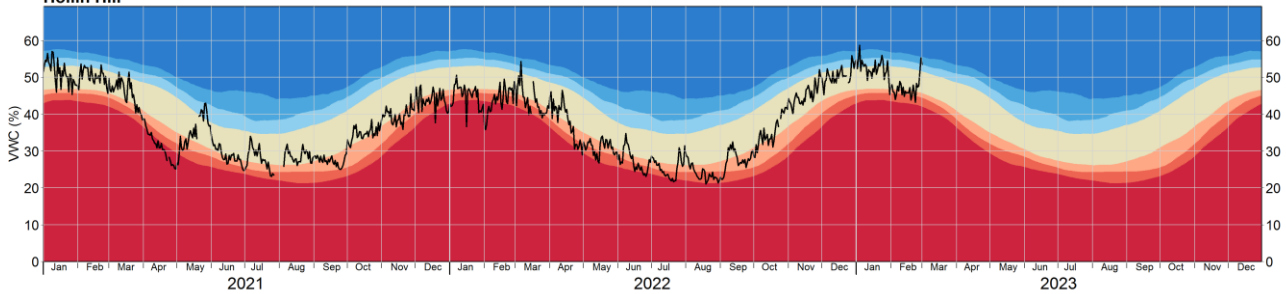




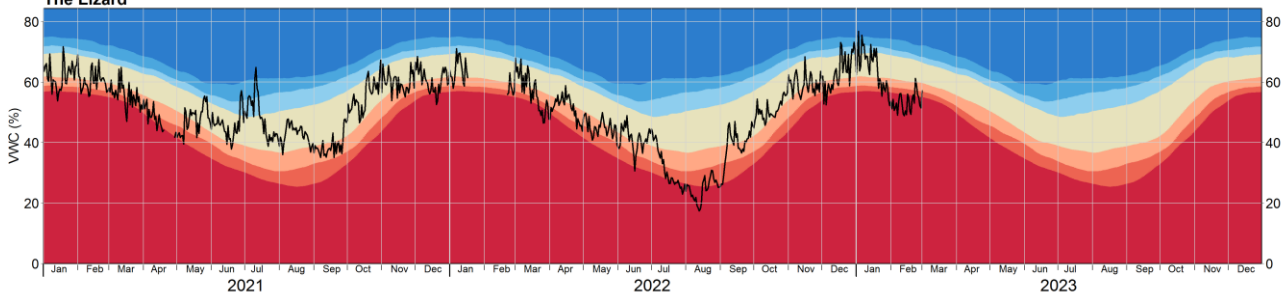
Hartwood Home



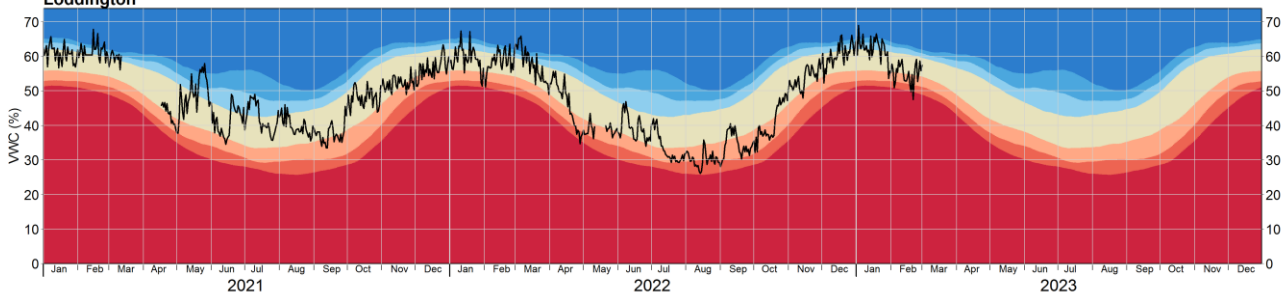
Hollin Hill



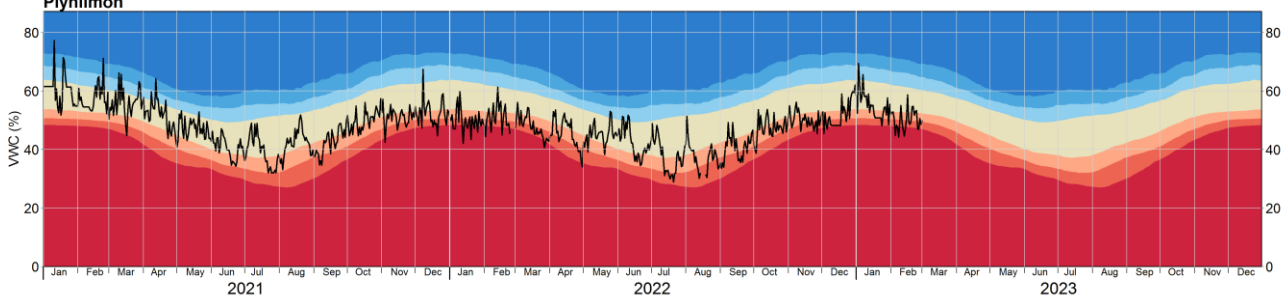
The Lizard

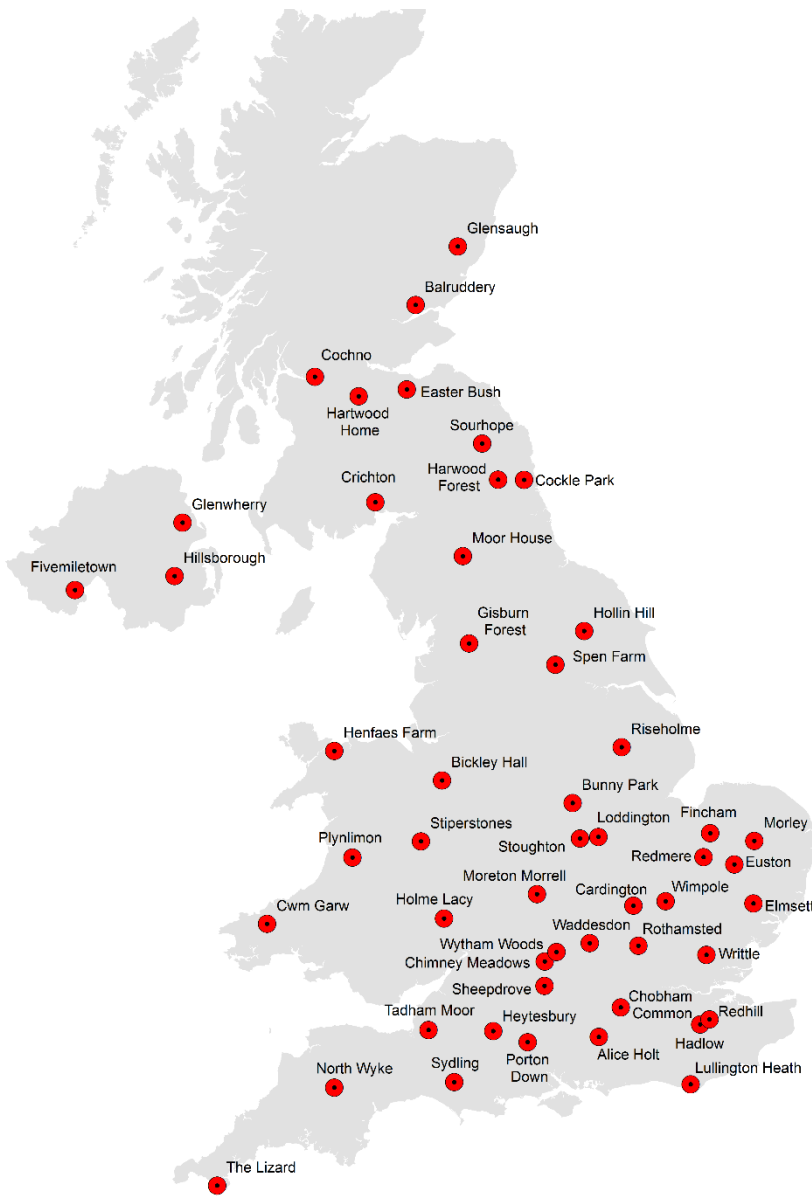


Loddington



Plympton





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 by the Natural Environment Research Council award number NE/R016429/1 as part of the UK-SCAPE programme delivering National Capability.

