

Soil moisture on 31 January 2023 (see back page for explanatory comments).

Notes on period to 31 January 2023

January had higher precipitation than average across most of the UK, with high soil moisture at COSMOS-UK sites declining at the end of the month.

Provisional data for January indicate above average rainfall for most of the country apart from the Northeast. Northwest England, Southwest England and Southern Scotland in particular experienced high precipitation in beginning to mid-January. The start of the second half of January brought freezing conditions, with the lowest temperatures being recorded at sites in Southeast England such as Chobham Common and Euston which reached lows of -10°C. Towards the end of the month, air temperature rose, and precipitation declined.

Most COSMOS-UK sites exhibited soil moisture within their normal range for January, though with a declining trend towards the end of the month after peaking in December to early January. Soil moisture status between sites varied considerably, with some sites such as Balruddery and Tadham Moor continuing to be very wet for most of the month, whereas other sites such as Crichton and Chobham Common fell to drier levels.

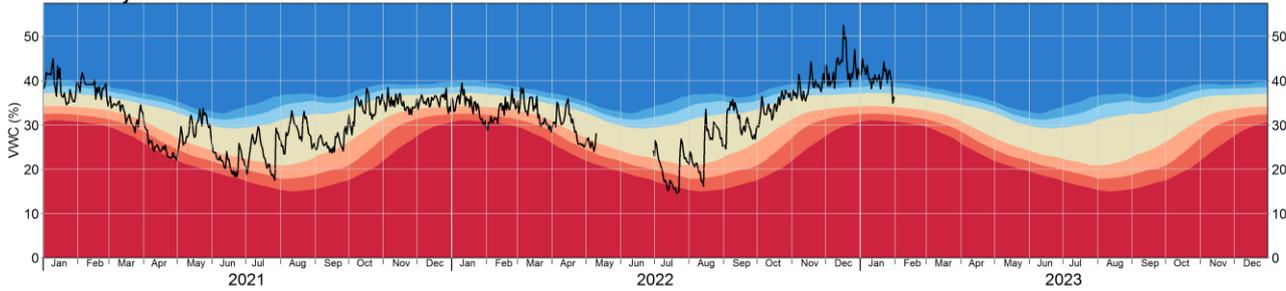
Overall, most sites showed normal to wet soil moisture conditions, with a declining trend at the end of the month from their high moisture levels at the start of the year. This follows the decline in precipitation seen over the last 1-2 weeks.

Network News

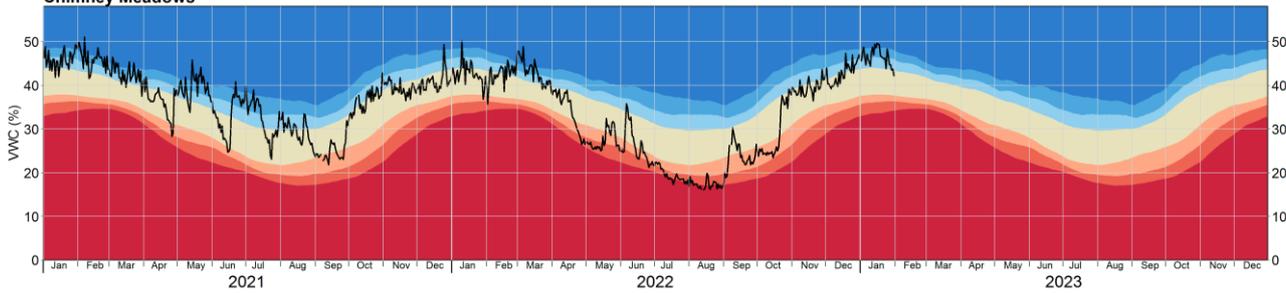
The CRNS neutron counter at Stiperstones was repaired and replaced, allowing water content calculations again. The soil moisture sensor (TDT) array cabling at Sydling is to be protected with armoured conduit to prevent further rodent damage. The snow depth sensor is to be replaced at Moorhouse.



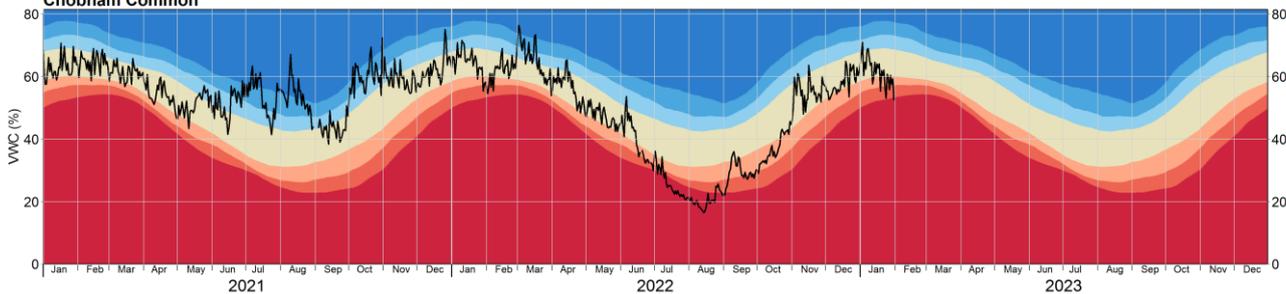
Balruidery



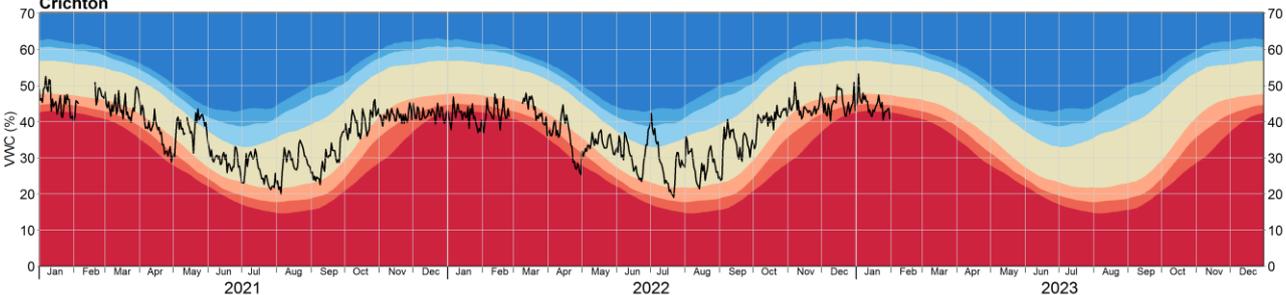
Chimney Meadows



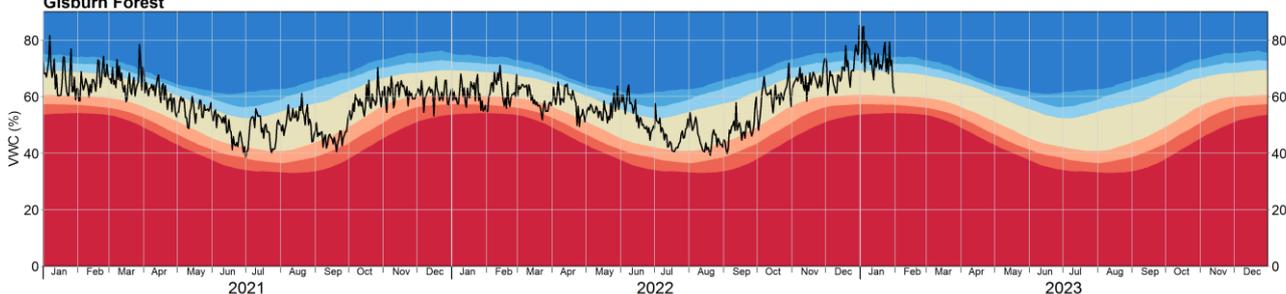
Chobham Common

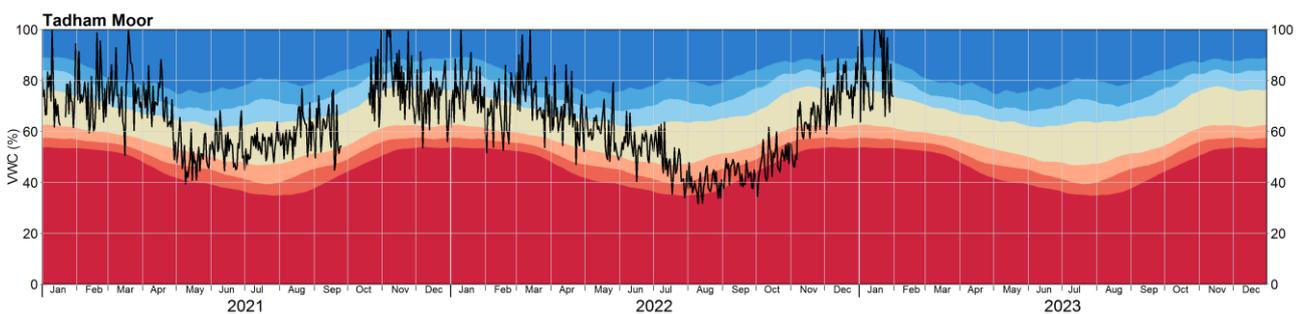
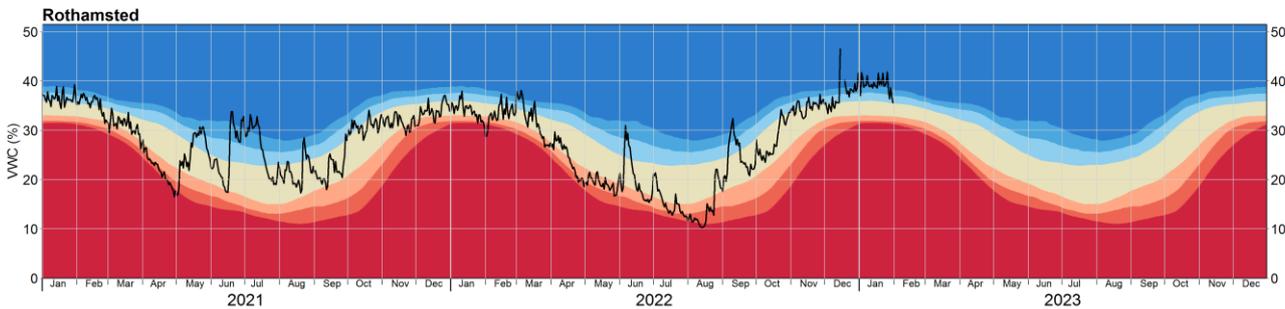
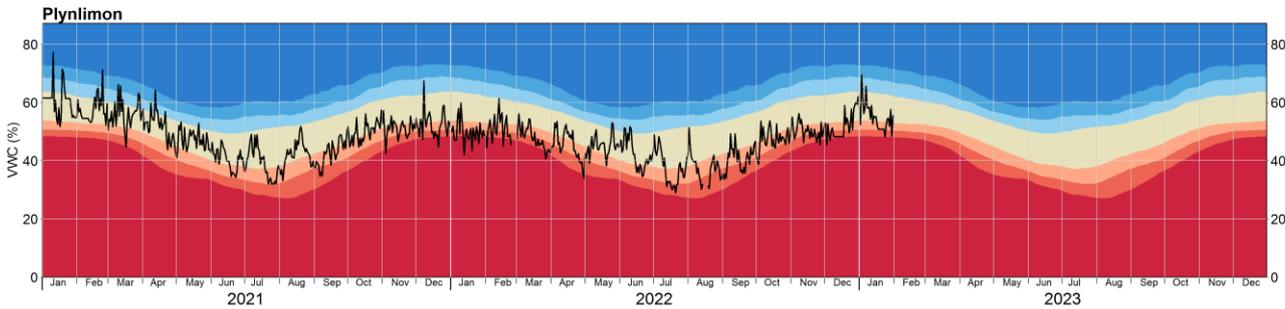
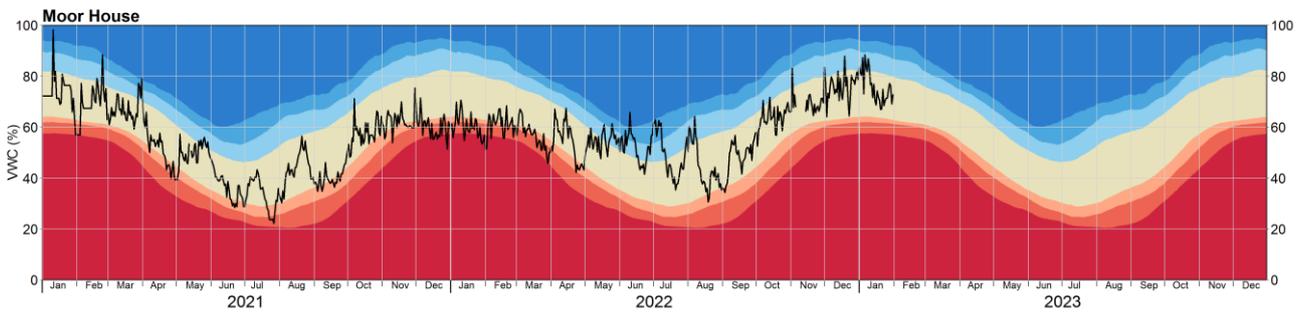
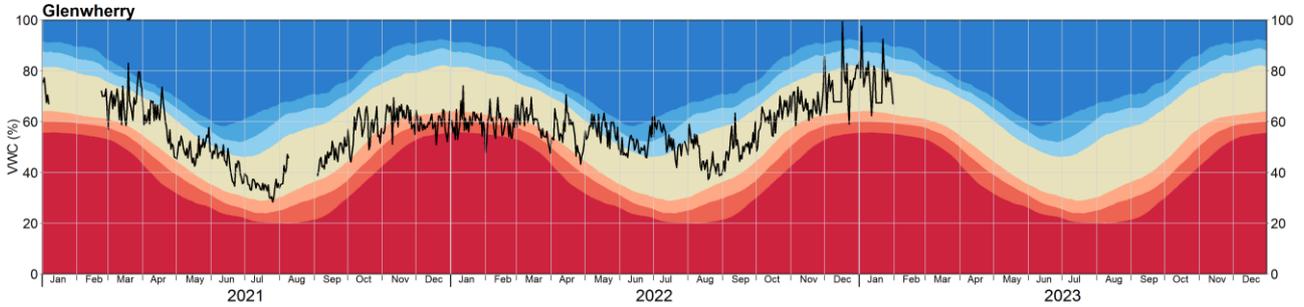


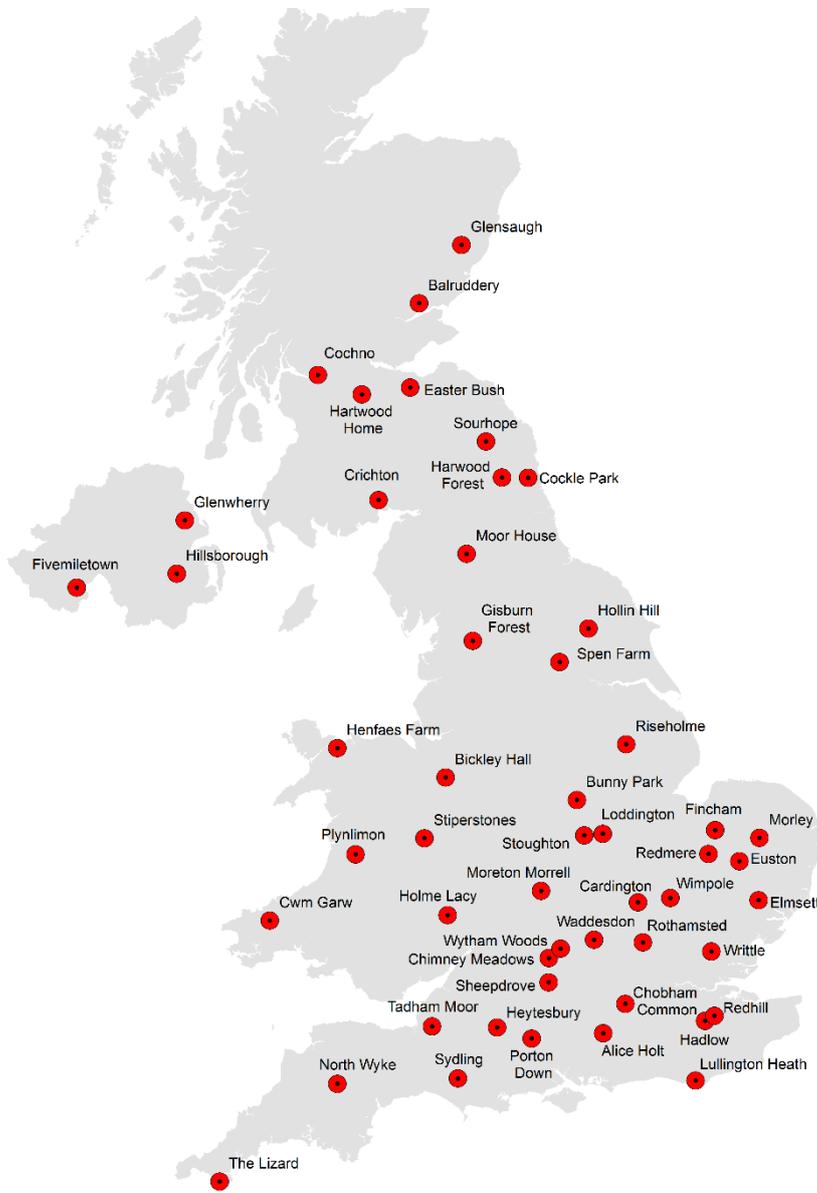
Crichton



Gisburn Forest







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.

