

Soil moisture on 30 November 2022 (see back page for explanatory comments).

Notes on period to 30 November 2022

Increased precipitation throughout November has resulted in all COSMOS-UK stations wetting up to above or close to field capacity.

Provisional data indicate precipitation in England and Wales was higher than the long-term average for November. Scotland was close to the long-term average in the first half of the month, whereas heavy rainfall in the second half of the month (particularly in Eastern Scotland) saw precipitation rise above the long-term average. Northern Ireland remained close to the long-term average for most of the month. Southeast England was the wettest region in the UK. Air temperatures at most of the COSMOS-UK sites were on a downward trajectory from the start to the end of the month, with many sites experiencing a 5°C drop.

Most of the COSMOS-UK sites had soil moisture within or above the normal range over November. Balruddery, in Eastern Scotland, has been within the saturated range after heavy rain. In contrast, Crichton, in Western Scotland, was drier than usual for much of the month. In England, Spen Farm and Redhill were both very wet. Hadlow shows continued recovery from being unusually dry over the summer to wetter than usual during the autumn. Sites located in the west, such as The Lizard, have shown slower recovery in soil moisture than the more eastern sites.

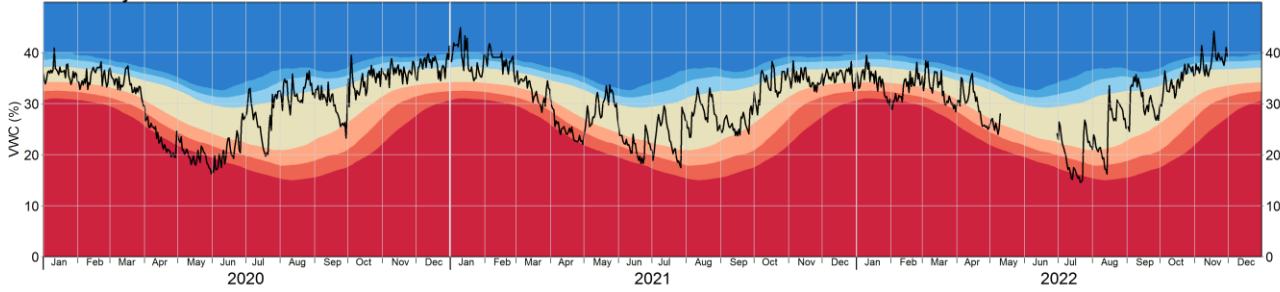
Generally, soil moisture conditions are recovering from the dry summer after prolonged rainfall in many regions in November, particularly in Southeast England.

Network News

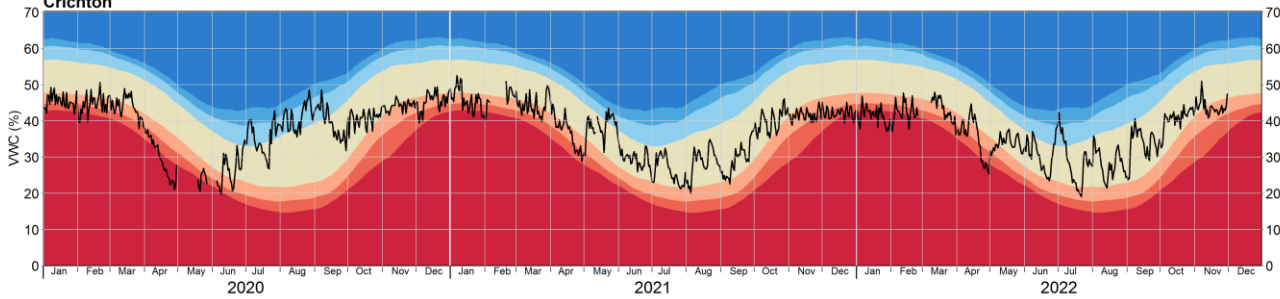
Moor House and Porton Down are now fully operational, but there was a SIM card issue at Plynlimon, which is scheduled to be fixed early December.



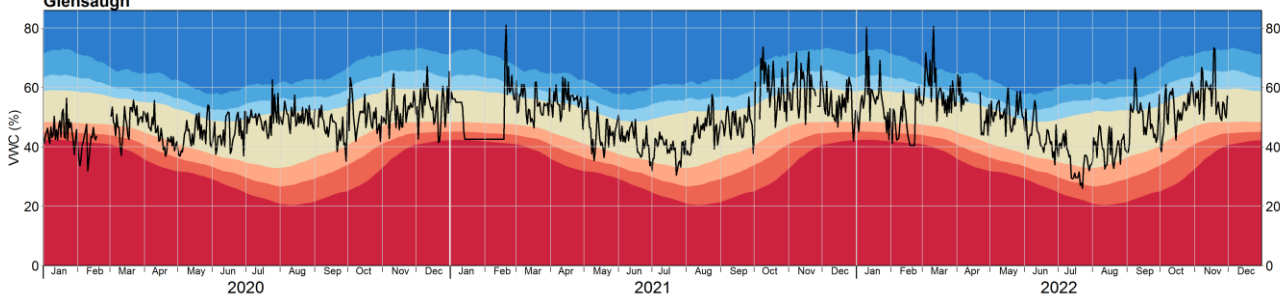
Balruidery



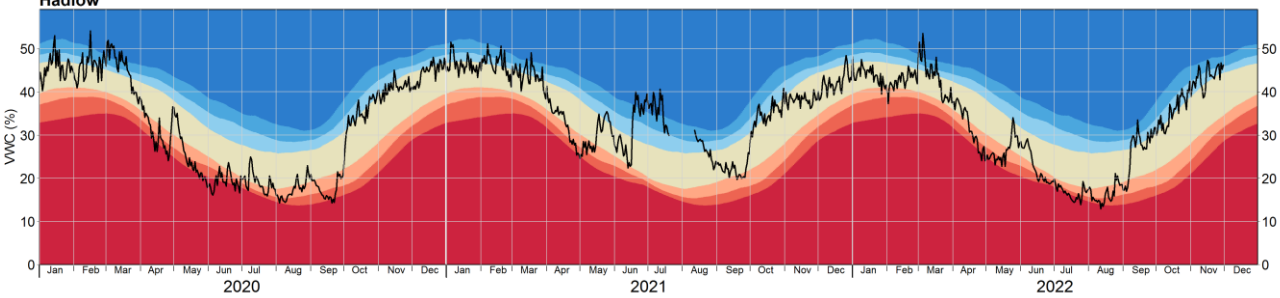
Crichton



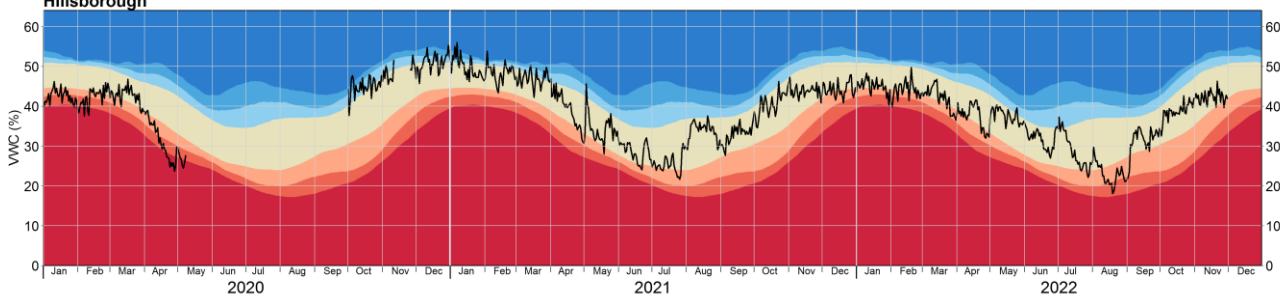
Glensaugh

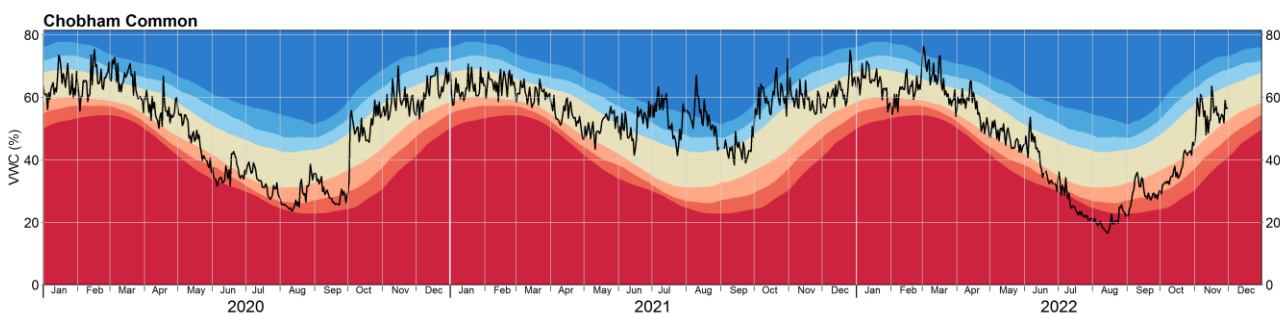
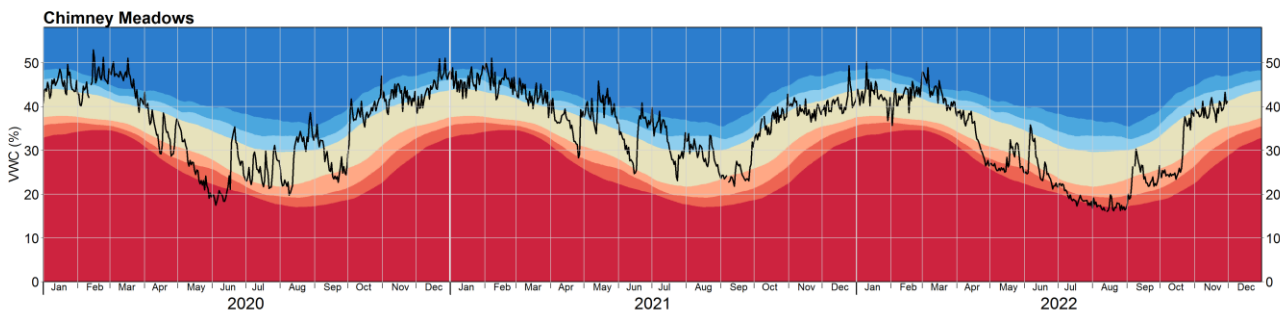
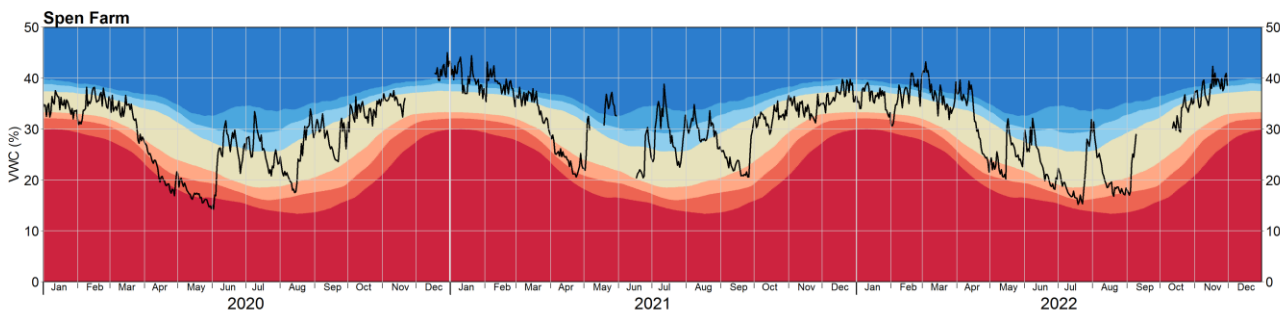
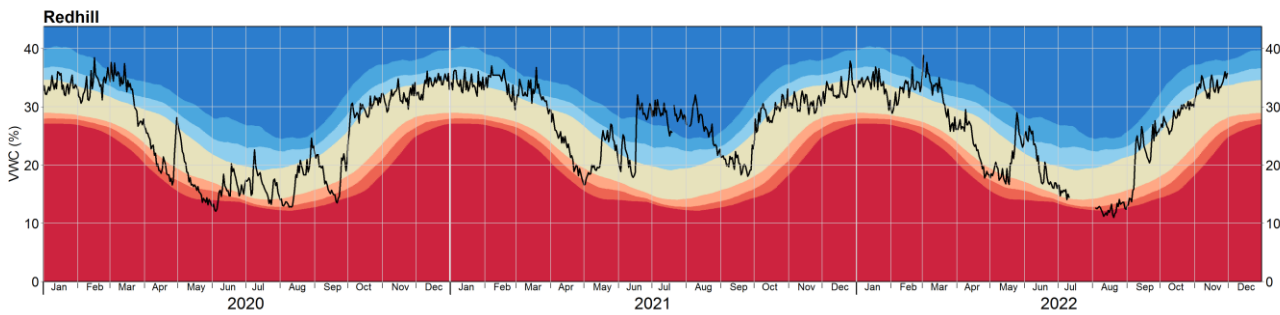
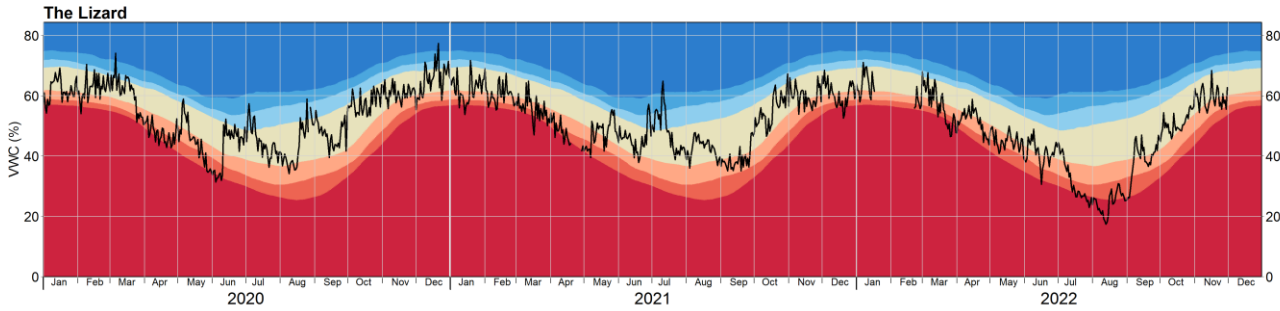


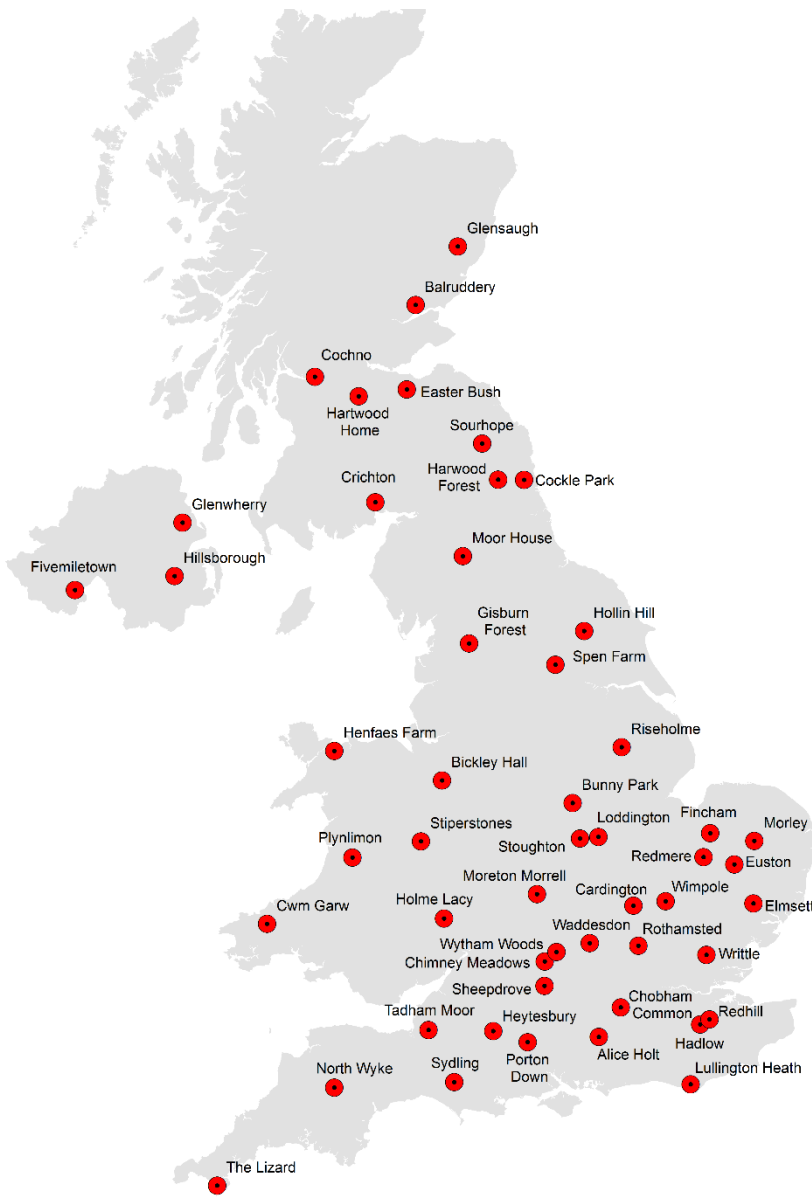
Hadlow



Hillsborough







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.

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