

**Soil moisture on 30 November 2019** (see back page for explanatory comments).

**Notes on period to 30 November 2019**

**Soil moisture across the UK is generally above normal for the time of year, although soils in northern and western areas of the UK are closer to normal for the time of year.**

Provisional data indicate that precipitation in November was above average in England and Wales, with only north-west England having close to average precipitation. Northern Ireland and southern Scotland also had close to average precipitation but while precipitation was above average in eastern Scotland it was below average to the north and west of Scotland. In most places the end of the month saw a period of dry weather.

In most areas soil moisture was at or above average at the start of the month and given the generally above average rainfall during November this is the situation at the end of the month, especially in the southern half of the UK. Some sites have now seen above average soil moisture for the past two months (e.g. Bickley Hall, Elmsett, Redhill, Stoughton).

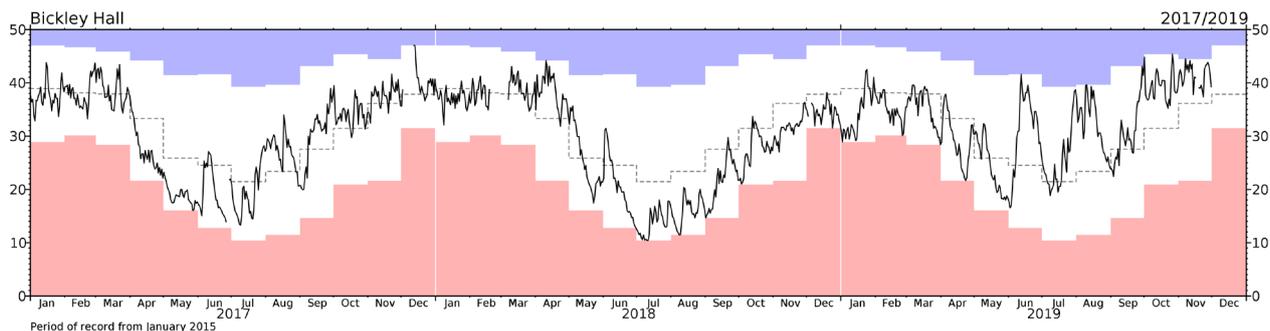
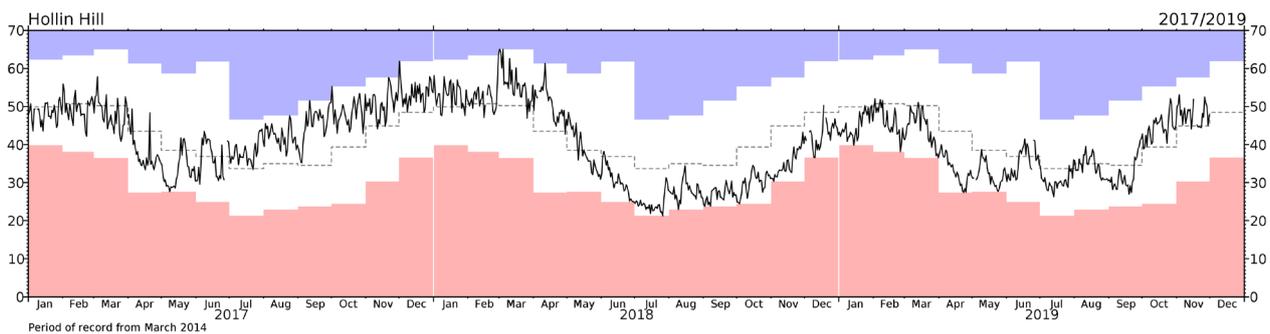
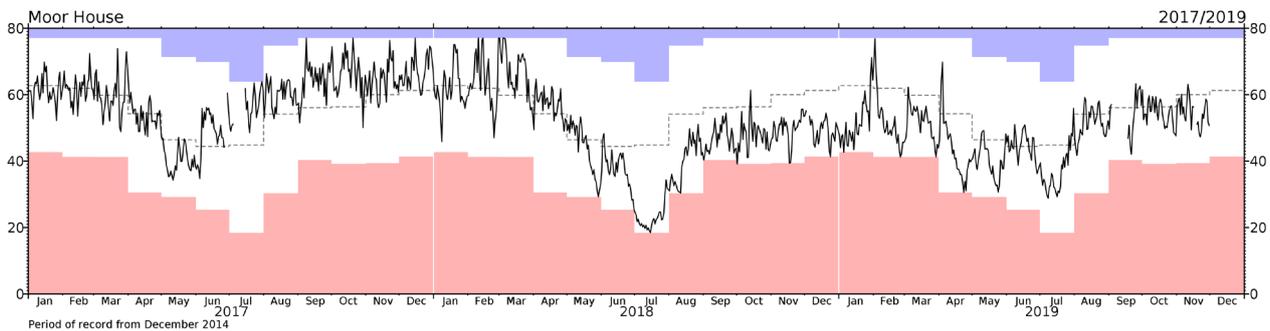
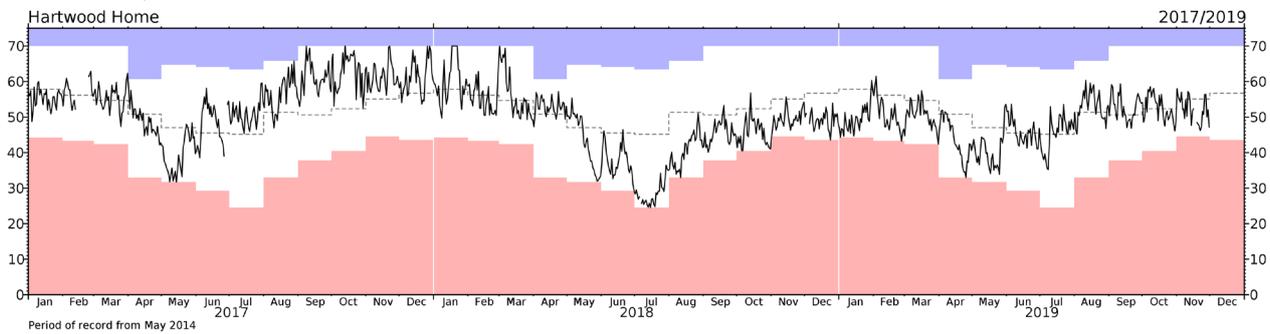
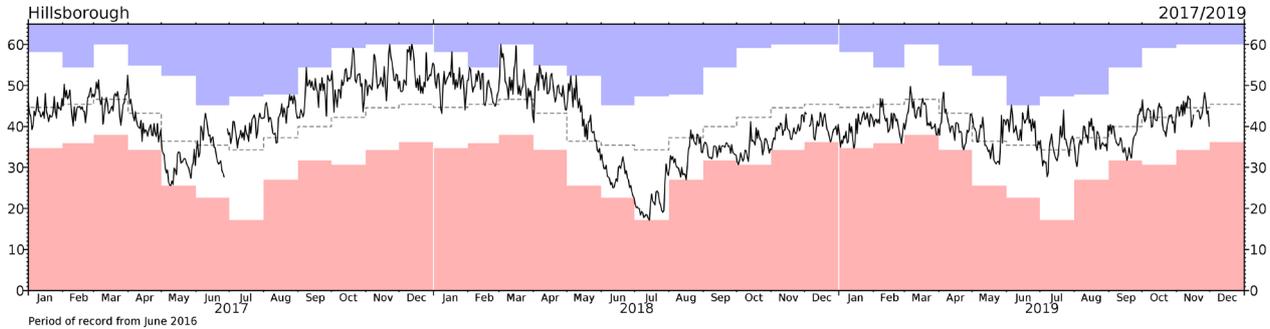
However, despite the generally wet nature of November some sites in the same part of UK show normal or even below normal soil moisture for the time of year (e.g. North Wyke, Morley).

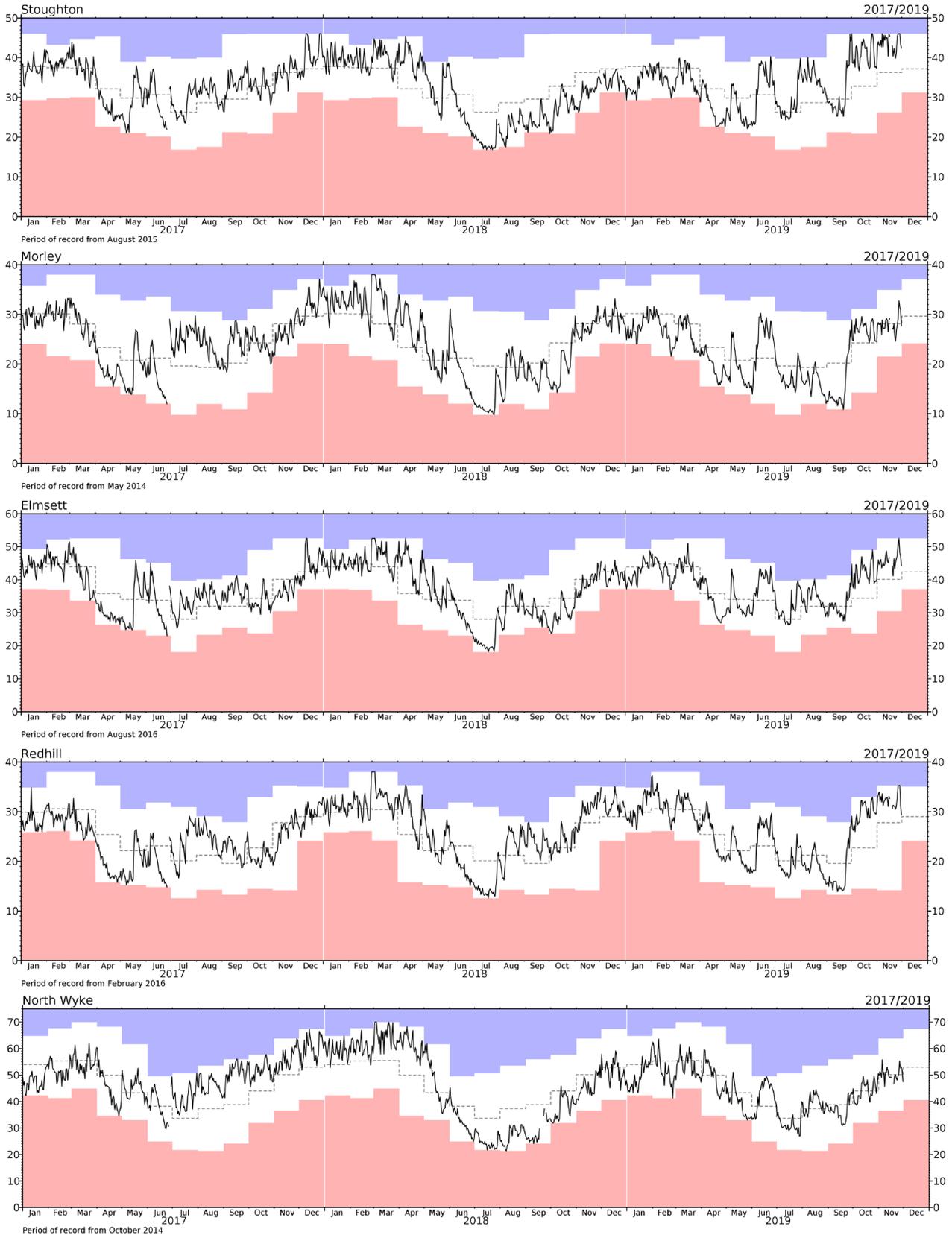
Further north soil moisture is generally close to normal (e.g. Hillsborough, Hollin Hill), or perhaps slightly below normal for the time of year (e.g. Hartwood Home, Moor House).

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.

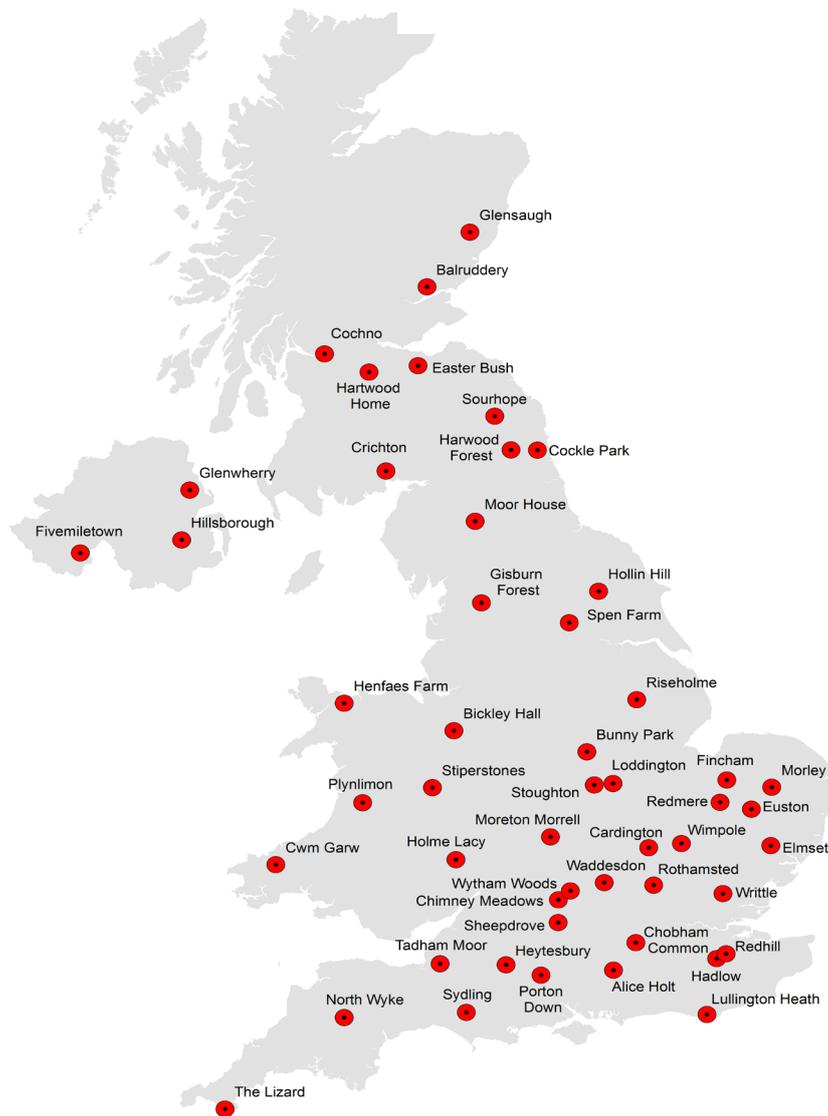
**Network News**

- Processing of daily mean soil moisture has been modified slightly, most notably to cap extreme values to a probable maximum value.
- A power cut at the Cosmic-ray reference counter at Jungfraujoch means there is a gap in soil moisture data at all sites for the 17<sup>th</sup> and 18<sup>th</sup> November: we hope to in-fill this period in due course.





### 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.



**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.

Grey 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.

**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