

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

## Notes on period to 30 September 2019

**Soil moisture in southern parts of the UK is generally above normal for the time of year, and very much above normal in places. In northern areas soil moisture is close to normal for the time of year.**

Provisional data indicate that rainfall in September was close to average in Scotland and Northern Ireland. In England and Wales there was generally below average rainfall for the first 20 days of the month, followed by ten very wet days that resulted in monthly totals being above average, substantially so in all areas except the south-east.

At the start of September the south-east quarter of the UK was drier than normal, but the heavy rainfall at the end of the month has caused a rapid increase in soil moisture to levels very much above normal for the time of year (e.g. Lullington Heath, Rothamsted, Stoughton). At some sites in this area soil moisture was particularly low at the start of the month and has now increased to close to normal levels (e.g. Chobham Common, Cardington).

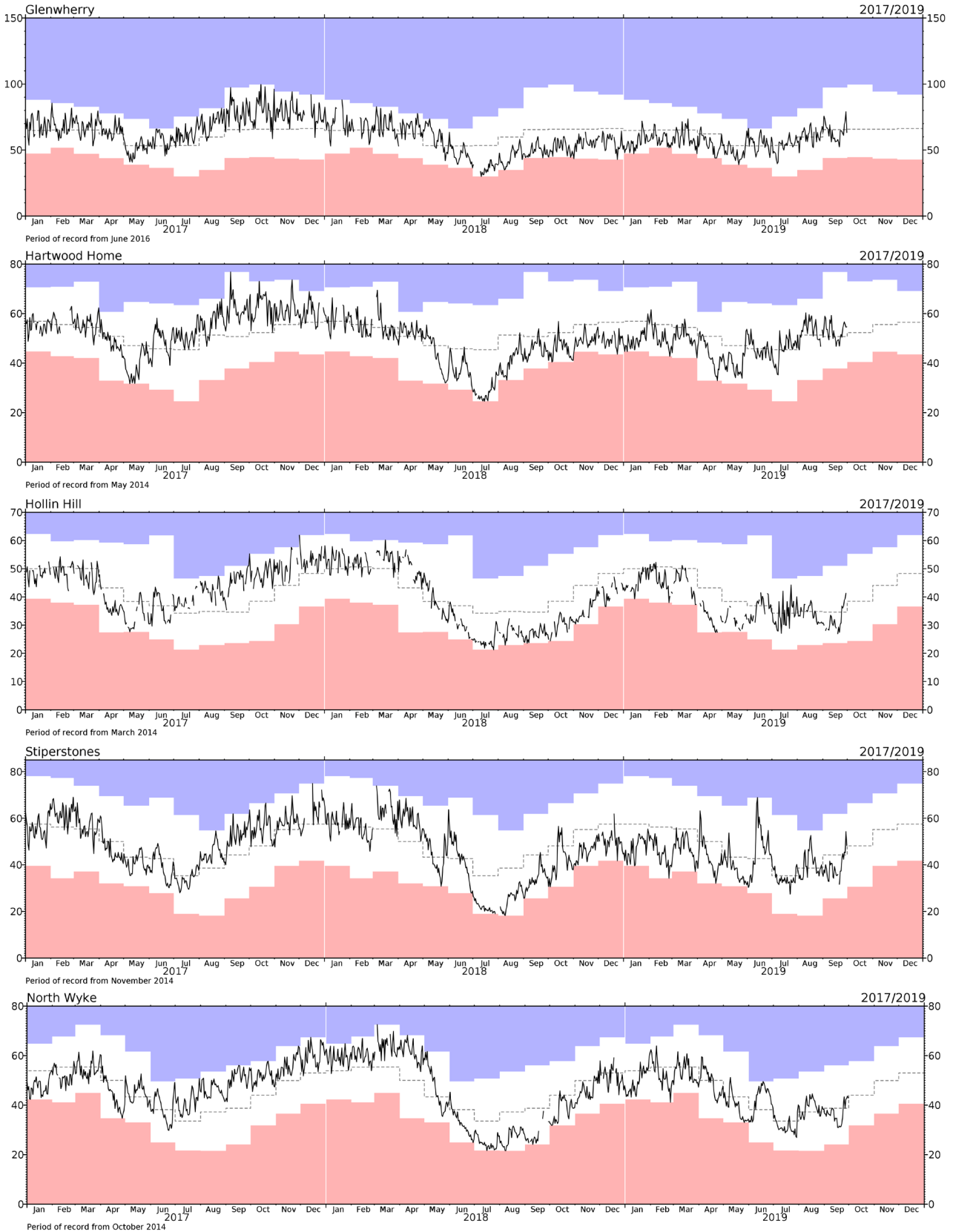
Outside this area to the north and west, increases in soil moisture have been less dramatic (e.g. Hollin Hill, North Wyke, Stiperstones).

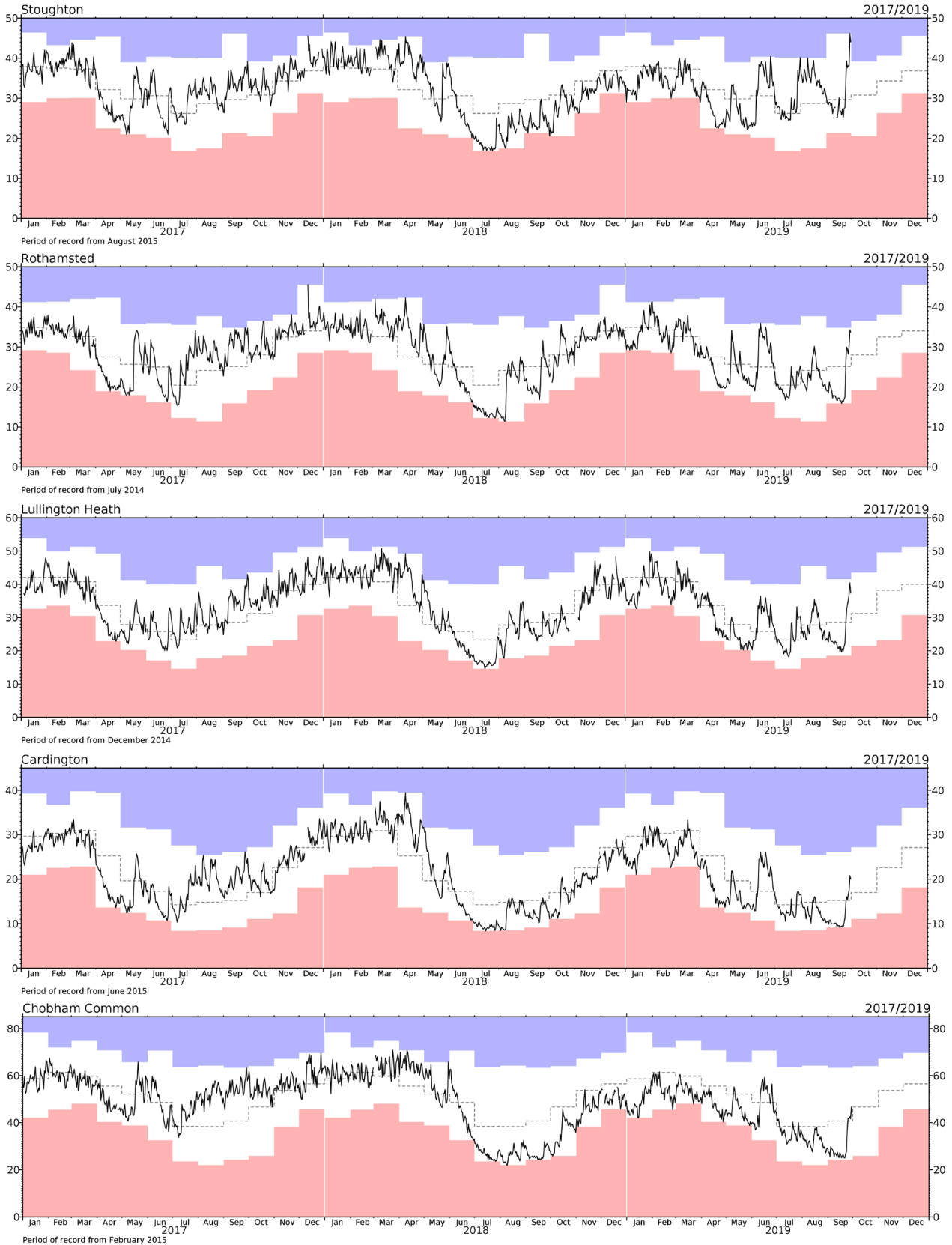
In Northern Ireland and Scotland soil moisture has been close to normal throughout the month (e.g. Glenwherry, Hartwood Home).

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.

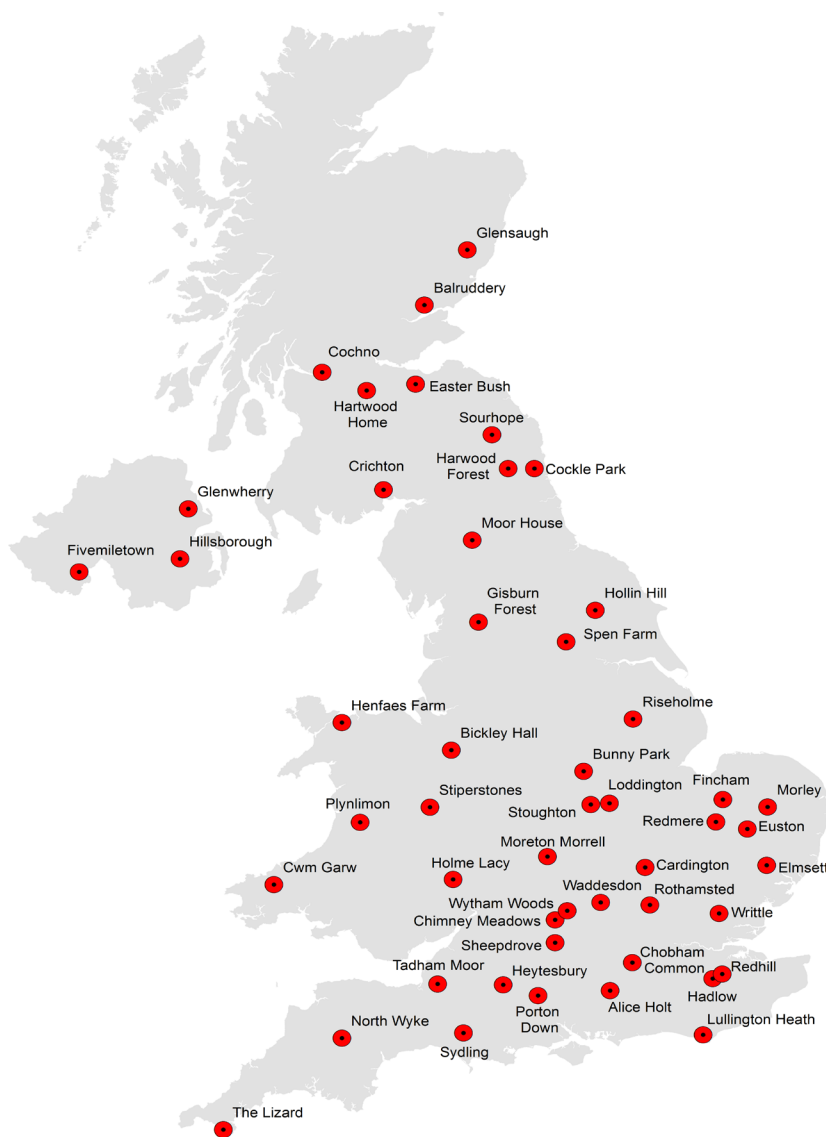
## Network News

- With the installation of a site at Wimpole, near Cambridge, COSMOS-UK now has 49 operational sites.
- There were 17 site visits in September: 15 for routine maintenance and two for fault fixing.
- Issues with several raingauges remain unresolved.





### 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