Minor revisions for manuscript: **Improvement of modelling plant responses to low soil moisture in JULESvn4.9 and evaluation against flux tower measurements** by A.B. Harper et al.

We thank the reviewer for taking time to review the manuscript again. Below are our responses to the points raised in the second review. Line numbers refer to lines in the new manuscript.

L253: Somewhere would be good to acknowledge that exact rooting depth estimates remain uncertain

We have mentioned the uncertainty in maximum rooting depth at lines 254-256 and line 573.

L254: No justification for deeper soil provided, the above discusses roots. It is obviously needed to implement deeper roots but where does 10.8m come from? Saying it was previously used to study freeze-thaw dynamics doesn't really provide an explanation

One aim of the study was to find a recommended set up for JULES for global simulations and future use in the UK Earth System Model. JULES does not have the flexibility to use different soil column configurations in different regions, so any new soil column we suggest to improve the representation of water stress has also to work well in, for example, permafrost regions. We used the 10.8 m soil since this is already being used by many in the JULES community, and because it results in rooting profiles that are not far off from the measurements from Canadell et al. 1996. We have tried to explain this better in the text (Lines 257-260).

L258: Check grammar

The sentence has been reworded. (line 263)

L264: 87% is less than the number provided on L259 (99%) so how does it increase deep root access?

We have clarified that the bottom soil layer extended from 7.8 to 10.8 m, so the remaining 5% was from this layer in the regular soil14 experiments, and therefore 13% of the extraction is from the bottom layer in the soil14_dr*2 experiments. (Lines 265-266) In addition, we updated Figure 2 to include the effective root profiles for all of the experiments discussed in this manuscript.

L314: Above (L308) you say that the sites were selected based on soil moisture measurements. So why was it necessary to derive a subset of 21 sites with soil moisture measurements?

We did not receive a response from every site PI where soil moisture measurements were available, which is why we only had 21 sites with soil moisture prescribed. This has been clarified in the text, also in response to the next comment. (Lines 322-325)

L313-318: Not really clear from this that the soil moisture and LAI data were used to drive JULES (where available).

We have clarified this paragraph so hopefully it is clearer.

L350: But VR was also too low for tropical savannas etc. on L349? Do you mean it was particularly low for cold grasslands and croplands?

The VR was less than one for the other biomes, but not as low as the cold grasslands and croplands. We've re-ordered these sentences, so hopefully it makes more sense. (Lines 367-371)

L373: Should this only refer to Figure SM3?
You are correct, thanks for catching this.

L390: Should this say section 3.4?
This should be Section 2.4, so it has been changed.

L563: Point out that future studies should also use more sites? Not clear why the main analysis here was limited to just 11 sites
The 11 sites were based on the analysis of simulated GPP without soil moisture stress. We've added a sentence to clarify this in the relevant section, section 3.2 (Line 413). Also we added a sentence to say that many more sites are available and would be useful in future studies in Section 4.3. (Lines 592-594)

Figure SM4: The panels are out of alignment and many rows are missing the y-label
This has been fixed.

We also updated figures 5-7 in the text to have the y-axes labelled with the units.