

Response to the comments by Eleanor Blyth

This paper is very well written. The logic and clarity are excellent. The science is also very clear. The authors have tackled the issue of how to model chalk within a land surface model, including the issue of linking to a ground water model. The presentation is clear and the results very good.

We thank Eleanor for the comments and enthusiasm she expressed with regards to the potential of the undertaken research. The comments are addressed below in blue. There is no reference to the exact pages/line numbers as those are not known before the typesetting.

There are only a few issues with the presentation I would like to make: Firstly: can you name the model version at the end of each introduction of the improvements in Section 3. So at the end of 3.2, you could say 'this is referred to as JULES+PDM' and at the end of section 3.3, you could say 'this is referred to as JULES+PDM+CHALK' etc. Then in Section 4 it is more obvious where they have come from.

The configuration names have been added.

Secondly: Can you refer to Figure 3 when you are explaining the dual curve in Section 3.3. It isn't clear from the text how the model would know which curve it should be using. In Figure 3 it is obvious.

Figure is a part of the results and as such belongs to the Results section, not to the Method section that describes how to obtain such a dual-curve representation. The following has been added to Section 3.3 to clarify the dual curve representation (in italic):

"Due to the two distinct flow domains in chalk - matrix and fractures, two *intersecting* Brooks and Corey curves are employed when fitting a chalk soil moisture retention curve. *The effective soil moisture at the curves' intersection is estimated using available observations.*"

Thirdly: The acronym CHESS stands for: Climate, Hydrology and Ecology research Support System. Although I quite like yours too! But we need to stick to one.

Corrected – thank you.

Fourthly: Can you have fewer and bigger graphs in Figure 2. We don't need so many examples of the same thing, but we need to see them better.

The number of figure panels has been reduced.

Apart from that, well done all on an excellent piece of work. This should really move the science on