General comments:
The authors investigate the role of vegetation cover on infiltration and soil moisture distribution at a fallow plot in Southern Sardinia. The study was performed by a combination of experiments and modelling. Information about soil moisture distribution, gained from TDR measurements and indirectly from electrical resistivity tomography during an infiltration experiment, was used to analyze feedbacks between the sparse vegetation cover and the soil hydraulic conductivity. In addition, a simple bucket model was set up. The model was used to analyze differences between the fallow plot and a neighbored cultivated plot in the local water balances during the infiltration experiment. The model purpose was further to simulate changes in soil moisture of the upper soil and the deeper soil at the fallow plot during one year depending on soil coverage by weeds.

We do not completely agree with this summary of the manuscript contents.

The modelling exercise was intended to conceptualize within the framework of a soil-vegetation-atmosphere bucket model our experimental evidence: the upper layer of the fallow plot behaves as a poorly conductive (crusty) layer with macropore conductivity caused by the vegetation disturbance to the soil structure.

The conceptualization was validated at the scale of the infiltration experiment and for the sake of completeness the behaviour of the neighbouring cultivated plot (where no crust developed and no macropore flux occurs) was shown.

Finally the impact of the interrelation between soil and vegetation on the yearly water balance was evaluated. The importance of macropore flow is evidenced by comparing the conceptual model outcome (case CC=0.4 with the same assumptions of Fig 9) with an hypothetic case where vegetation does not grow over the fallow plot (invented for the sake of speculation) (Figure 10).

The numerical exercise is performed to quantitatively *speculate* on the importance of the soil vegetation feedback (in the fallow plot only) at yearly time scale since this may be the relevant scale for ecosystem maintenance.

The experimental part of this paper is sound and also the interpretation and the conclusions, which are drawn from the experimental data, are coherent. I can also follow the reply of the authors to the questions of the Referee#1 to the discussion paper, who argued that the experimental part of the study was already presented in a previous paper. In my opinion, the reinterpretation of the data, partially presented in Cassiani et al. (2012) but now based on a different inversion technique of the ERT signals, delivers substantially new insights in moisture dynamics at the fallow field and is therefore of high interest for the readers of HESS. Besides of some points already pointed out by Referee#1, I have only some minor comments on this part of the paper (see below).

We thank Reviewer 2 for these positive comments – that also show the value of the interactive review process implemented by HESSD.

However, I have major concerns with the modelling part of the study, in particular with the long-term simulation over one year and how conclusions are drawn from the modelling results. The section "Model outcome" remains more or less speculative because the simulation results are based on questionable model assumptions and are extremely dependent on initial conditions, which seem to be arbitrarily chosen without an experimental basis.

Moreover, some findings which are represented as “model outcomes” follow directly from the settings and assumptions in the model. Consequently this part of the modelling exercise provides no additional benefit to the entire study.

We agree with the first statement but disagree with the second. Indeed a large part of the modelling exercise is speculative, albeit not by itself void of value. Of course it is true that the model results depend on the assumptions made (which model is not like this?) but the model predictions are not simply an obvious and useless consequence of the model assumptions.

The setting and assumptions are consequent to our interpretation of the experimental data and the model is used to test if the experimental evidence may have an impact on the yearly water balance.

I recommend, therefore, either to omit the one-year simulation and to focus on experimental results including the short-term infiltration model

We disagree with the reviewer (for the reasons already stated above).
Omitting the annual water balance would reduce the study to a case of potential detection of macropore flow with innovative experimental techniques. We believe it is worth discussing using a quantitative model to what extent these experimental data could advance our comprehension of the ecosystem functioning.

or to reformulate the model for the one year study.

We believe that the system functionality (bulk and macropore flow due to the soil vegetation feedback) must be one. It derives from the hydro-physical control of the soil-vegetation continuum on the water balance.
Why should the soil-vegetation continuum behavior be different at different time scales? Dependence on scale is not uncommonly a symptom of erroneous or at least limited modelling formulation.

In the latter case, the model-based analysis should also include an analysis of the impact of different initial conditions on simulation results.

The initial condition that was analyzed is the one that ensure the closure of the yearly water balance. What other condition should be analyzed?

Specific comments:
My major concerns with the modeling part of the study are two model assumptions, which may be valid for the 7-day period of the infiltration experiment, before which probably a solid soil crust has established on the fallow plot, but are certainly not valid for a whole season with longer rain events during autumn and winter.

Note that in Sardinia the overall precipitation is limited – and very long periods or rain are extremely rare.

The criticalassumptions are

i) no transpiration takes place from the USL

this is a common assumption for a thin USL. We provide the reference (Kurc and Small, 2004, 2007) in 11159 line 7

and ii) Lu = 0 in case of bare soil, irrespective of saturation in the USL.

This is the ideal assumption that characterizes the extreme case of no vegetation and no macropore flow that we use to speculate on the relevance of the soil vegetation feedback.

The fallow plot has Lu>0. (11160 lines 9-10) "Excess water percolates into the deeper soil layer…"

The first assumption does not longer hold as soon as soil moisture in the USL is significantly higher than permanent wilting point for more than two or three days, because plants react very flexible to favorable environmental conditions. For example, in figure 5 (right) in Cassiani et al. (2012) it is shown that the weed from the bare soil plot has clearly active roots in the upper 10 cm of the soil.

We disagree. Actually, Figure 5 in Cassiani et al. (2012) shows that the crop has shallow active roots (but by capillary rise water can and is drawn also from deeper in the soil profile) whereas the root density of the weed is restricted to the deeper soil layer depth, according to the evidence provided in the literature (Kurc and Small, 2004, 2007)

The explanation on page 11163, line 23 – page 11164, line 8, to which I totally agree, is contradictory to the second assumption, that Lu=0 in case of bare soil. Figure 5 clearly shows that a decrease in resistivity occurs even in those parts of the deeper soil, where the soil is not covered by plants ("piston flow").

Indeed we do not assume that Lu=0 in the fallow plot.

Page 11166, lines 13-14: is there any evidence that there was no transpiration before DOY 80 and after DOY 274? Which species were grown on this plot? Are there observations of the growth stages of the weeds?

We do not have this observation and made reasonable assumption concerning the vegetation growth.

Page 11166, lines 14-16: how was this accomplished? Is it the result of a spin-up run of several years? How was Sd(1) fixed in case of CC=0? In this case equation (4) degenerates to d(Sd)/ dt = 0 and Sd(1) determines the saturation degree for the whole year.

This comment is not clear to us. If S(1) =S(365) on a yearly base for the system of two layers the water balance is closed: P-ET-RO =0

Page 11166, lines 23-24 "the red and the green lines coincide in between DOY 170 and DOY 280": This is not a model outcome but directly follows from the boundary conditions of the model (initial value of Sd(CC=0) = lower transpiration limit of CC=0.4).

This point is also unclear. The boundary conditions are established by the yearly (integrated) water balance for the two scenarios (the real and the "extreme" one).

Page 11166, lines 24-25 "During the summer season, Su is higher for CC = 0.4 (black line) than for CC = 0 (blue line) due to the vegetation shadowing": This is not surprisingly, because it is the direct consequence of the assumption that in case of CC=0.4 a part of ET is taken from the DSL (Lu = 0, because Su<1 during summer), whereas in case of CC=0 all ET is taken from USL.

Page 11166, lines 25-27 "during the wet season Su is higher when CC = 0 (blue line) due to the fact that when CC = 0.4 the USL transfers water to the DSL that acts as a reservoir and the vegetation facilitates the infiltration": This is also no 'model outcome'

but the underlying ‘model assumption’.

We are not surprised, we just describe the seasonal impact of the soil vegetation feedback. Model assumptions and model outcome are, of course, intimately inter-related.

Thus, from my point of view, the one-year modelling part of this study provides no further explanation of or insights into soil-vegetation feedbacks in this experiment and can be omitted.

We disagree with this comment. The yearly water balance says that even with the scarce vegetation in the fallow plot rainfall returns to the atmosphere. Without vegetation up to 67% of water could be lost to runoff (11167 lines 18-24). This has an impact on the ecosystem, the climate, the water resources management, and makes the yearly water balance (influenced by the observed hydro-mechanics of the soil vegetation feedback), worth discussing.

Page 11167, lines 4 – 24: this is clearly no “model outcome” and should be therefore moved to a separate section “Discussion”. It would be much more interesting to see the differences between CC = 0.4 and CC = 0.0, when the model is run with identical initial values and assumptions. Are there differences in soil moisture distribution after one, two or more seasons due to the presence of vegetation?

See our reply above.

Minor comments:
On the whole, the manuscript is well organized. However, in the section “Results”, it is sometimes difficult to distinguish between real results and speculation. I recommend, therefore, to introduce a separate section "Discussion". Likewise, some paragraphs presented in “Introduction” belong rather to the section “Material&Methods” as already mentioned by Referree#1.

We will do it.

Some information is given repeatedly, e.g. page 11157, lines 16-17 “occurred overnight ..42 mm”: this has been already mentioned on page 11155, lines 25-26 and does not need to be repeated here.

We will fix this.

Page 11157, lines 21-23: avoid two times “before irrigation”.
Page 11159, line 13: probably “evaporation” instead of “transpiration”

Agreed

Page 11159, equation 2: how is RO calculated? Or is it measured? If RO is not considered in the model, it should not be introduced in the equation.

RO=P-ET since the yearly water balance is closed.

Page 11161, line 8: insert “)”
Page 11162, line 4: “2010” instead of “2012”

Agreed

Page 11163, lines 18-27: this explanation is further supported by results of Moijd and Cho (2008), Vadose Zone J. 7:972-980.
We can cite this reference. Thanks.

Page 11166, line 20: again “evaporation” instead of “transpiration” (?)

Agreed

Page 11177, Fig. 3: vegetation “greenness” instead of “fitness”.
Page 11179, Fig. 5 and : Page 11181, Fig. 7: the increase in resistivity cannot be seen from this legend.
Page 11182, Fig. 8: “Vegetation cover is evaluated by VIA” should not be repeated here.

We will address all these minor comments.