

Interactive comment on “Responses of soil water storage and crop water use efficiency to changing climatic conditions: A lysimeter-based space-for-time approach” by Jannis Groh et al.

Anonymous Referee #2

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The manuscript by Groh et al. presents results from the lysimeter network SOILCan. The focus of this study is on the effects of different weather and soil texture conditions on crop water use efficiency using a space-for-time approach. Hereby, weighable lysimeters with soils from four sites were moved and monitored at two of the sites with a drier and wetter climate, respectively. Instead of assessing changes in soil water storage as a residual of the water balance components the changes in lysimeter weights were used to avoid an accumulation of errors. One of the main outcomes was that the water-use-efficiency was improved (due to lower evaporation loss from soils) under drier soil moisture conditions not following a linear function. Further, the effects of drought were still visible in the following season and even beyond that especially

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on finer-textured soils. Overall, the manuscript reads very well with a logical structure. The manuscript deals with the very relevant topic of changing climate conditions on agricultural productivity. The combination of weighable lysimeters in a space-for-time approach investigating four different soils with data over seven years provides valuable and interesting insights on how crop production may be affected. One of the strengths of this MS is that the authors present a comprehensive data set covering a seven-year period. The measurement data can be used for model development, calibration and validation. I recommend that the authors present such a model study in a follow-up paper. I recommend the acceptance of the manuscript upon minor revisions.

Specific comments M&M section Information about the soil texture of all four soil would be helpful as it later becomes an important part in the discussion (coarser vs finer textured soils) Figure 2 Please improve readability. Tick mark labels are very small L24 & L123 ‘monitored from April 2011 until December 2018’ versus ‘lysimeter data from April 2011 until December 2017’ Please clarify. L244-264 Could this be related to a higher infiltration capacity of the coarser textured soil allowing for a more rapid recharge? It would be interesting if the authors made any observations on silting, cracking etc. of the soil surfaces especially of the finer-textured soils which might explain deficiencies in soil water recharge. L410 ‘...net fluxes were observed...’

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