Hydrology and Earth System Sciences Discussions

Interactive comment on "Irrigation enhances precipitation at the mountains downwind" *by* J. Jódar et al.

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I do agree with the reviewers that the manuscript contains enough new material to have the paper published in HESS. However, since the analysis is statistical by design, a causal relationship between irrigation and downwind precipitation changes is difficult to prove, also given the low signal/noise ratio in the system. It is still possible that the changes in (regional) precipitation are attributable to other factors than the irrigation, factors that possibly affect the spatial pattern of precipitation (atmospheric circulation changes, trends in land cover or aerosol loadings). It would have been good to include analyses of other meteorological variables as well which are more closely related to the irrigation practice, such as humidity in the lowest atmosphere, precipitable water in the

atmospheric column, horizontal transport of moisture, variables that could possibly be deduced from direct observations (radio sondes) or reanalysis data. Maybe you could add a recommendation on this for future studies, where you may consider to consult a meteorological expert.

Some technical issues that need to be corrected or explained: 4.23: what do you mean with "land scheme"? 5.7 and further: what is the source of the irrigation water? Groundwater or surface water? 5.20: "in" -> "on" 6.20: "variation" -> "change" 6.21: please give some explanation why this metric is of relevance to this problem, and what it adds to the previous metric 6.22: the dPmin metric is very unclear. It expresses a change of number of rainfall episodes, but I don't know with respect to what. Is it the fraction of days with P>2mm? Or the fraction of wet days (P>0.1mm) with P>2mm? 6.25: a standard t-test is only valid if the underlying distribution can be considered Gaussian. Did you test this assumption? 7.11: reformulate as "The mean rainfall at MSs in ULV shows a common positive change in June and July (Table 1)." 7.23: it is unclear what "they" is 8.4: these low numbers (0.03%) should be truncated to zero, I believe 8.6: insert "the" after "increases" 9.10: insert "of the nr of" before "rainfall" Table 1 (caption): explain MSs and RSs Table 3: in the caption a more accurate definition of dPmin is needed (see 6.22) Fig 2: change the units in the legend to 10ˆ6 mˆ3

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