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List of changes

Below we list the changes implemented in response to the comments and suggestions of the Referees. The rationale of such changes is explained in detail in our previously submitted responses (available at https://hess.copernicus.org/preprints/hess-2020-549/).

Beyond the specific changes listed below, the manuscript and Supplementary Information (SI) have been carefully proof-read. Some minor changes not specifically requested by the Referees have been implemented in the text for enhanced clarity or readability.

All the implemented changes are apparent in the version including the tracked changes uploaded on the manuscript portal. The points below follow the same order of those taken up in our responses to the Referees. Line and section numbers refer to the revised version of the manuscript.

In response to the comments and suggestions of Referee #1, and in line with our previously submitted response to them, we have implemented the following changes in the revised manuscript:

1) Added a paragraph justifying the modeling approach to the soil water balance and discussing its key simplifying assumptions in Section S5.1 Modeling assumptions and their implications (SI, L421-433).

2) Added a new section at the beginning of Section S3 Additional results, titled S3.1 Water fluxes, presenting three new figures (Fig. S3-S5) summarizing the ratios of cumulated losses and irrigation to cumulated precipitation, for the model used in the manuscript. Because the addition of these pieces of information on the water fluxes required re-running the model, we have also replaced the corresponding figures (Fig. 4 and 5 in the main text; Fig. S6-S7 in the SI) and re-made the statistical analyses (SI, Table S3-S8), so that all the results are based on the exact simulations. The number of simulations was already high so using a new set of simulations did not lead to appreciable change in the results.

3) In Section S1.5 Numerical simulations, further emphasized the fact that we run the model for a series of concatenated 21-day periods, where the conditions at the end of one period are used at the beginning of the subsequent one, thus reflecting a long period of operation of all the hydrological processes (SI, L243-249).

4) Clarified the rationale behind the choice of the intervention point for irrigation, linking that to the irrigation technology, in Section 2.3 (L179-181) and S1.3.1 (SI, L187-194).

5) Reported and discussed the irrigation frequency, under the different climatic scenarios, in the new section at the beginning of S3 Additional results, devoted to the water fluxes (Section S3.1, L300-305). As discussed in the response to the Referee, the focus on such a short period as the anthesis, and the joint effects of pedoclimatic conditions and crop features, make it difficult to compare the resulting modelled frequency of irrigation and typical

applications. We however note that the irrigation application depths are in line with those typical of traditional acclimation.

6) Clarified our quantification of the effectiveness of irrigation in reducing canopy temperature and the duration of potentially damaging conditions, by further specifying the corresponding question in the introduction (L83-84); and referring to Table 1 and explaining its content in the discussion (Section 4.3 Irrigation reduces but does not cancel the risk of heat stress; L304-308).

7) Clarified that, while the model could be forced with site-specific climatic conditions, we used a weather generator and varied its parameters, in order to effectively and systematically explore a wide range of conditions in Section 2.3 Case study (L158-160).

8) Corrected the typos the Referee kindly pointed us to; and added the missing reference to Table 1 in Section 4.3.

In response to the comments and suggestions of Referee # 2, and in line with our previously submitted response to them we have implemented the following changes in the revised manuscript:

9) Started to prepare the model code for submission to Zenodo (https://zenodo.org/) upon manuscript acceptance.

10) Extended our review of the literature reporting differences in canopy-to-air temperatures under well-watered and water-stressed conditions in Section 4.1 (Soil water availability and air temperature jointly affect canopy temperature), to provide further evidence of the realism of the model results (L255-259).

11) Added a short paragraph in Section 4.3 (Irrigation reduces but does not cancel the risk of heat stress) to clarify the linkages between canopy temperatures and final yields, exploiting existing literature data (L301-304).

12) Mentioned the potential effects of irrigation on the duration of the developmental stages (including anthesis) in Section 2.3 Case study (L151-152) and Section 4.3 (L312-313).

13) Deepened the discussion on the effects of irrigation in Section 4.3 by explicitly mentioning the effects of extensive irrigation at the regional scale; and the corresponding effects of a change in temperature regime (L311-314).

14) Mentioned the role of rooting depth in Section 3. Results, with reference to previous result (L236-239).

15) Corrected the reference to Table 1 in Section 4.3.