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Discussions

Interactive comment on "The potential value of seasonal forecasts in a changing climate" *by* H. C. Winsemius et al.

Anonymous Referee #2

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The paper is an interesting academic exercise, but the reviewer is not convinced about some of the reasoning in the paper. The authors seem to want to have societal relevance while the paper does not have sufficient ground to do this. However, the reviewer has had limited and scattered time to review this paper during weekends, so might have misinterpreted part of the paper. The comments below could therefore lead to less large changes than suggested by the comments; it might be editorial to add more information for the benefit of the average HESS reader.

The main comments are listed below: âĂć If the heat stress indicator or dry spell indicator increase over the years, this does not mean that the seasonal forecast will be more valuable; the question would be whether (1) the variability in the indicators between different seasons increases and/or (2) the seasonal forecast improves. If a

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heat stress indicator / dry spell indicator increases on average due to climate change is not sufficient to make seasonal forecasts more important; it will shift agricultural choices to other crops/animal farming; âĂć Why necessarily combine the heat stress indicator and the dry spell indicator and climate change in one paper? The reviewer does not see any reference yet in two separate papers in which more information is given on whether these indicators seem appropriate for seasonal forecasts. The proof given in this paper on the predictability of the indicators used is not yet convincing – independent of the question whether they would be appropriate for the intended end-users. The expected changes in climate change and what this may do for agriculture in South Africa – without reference to seasonal forecasts – is a paper in itself. (It should be mentioned somewhere that climate change scenarios are very uncertain about rainfall in general – let alone dry spell prediction). âĂć The usefulness for end-users for individual farmers, as the prediction spatial resolution is too low for individual farmers. The grid cells are 50 km by 50 km but as the surrounding 8 cells are used for the probability distribution over the 40 year – the real resolution is coarser, isn't it? Does this still make sense for an individual farmer? âĂć It should have been mentioned straight upfront in the abstract, and in the methodology, that the A2 extreme emission scenario is used, which is only emphasized in 4.3.2. âĂć I am not sure if the indicator for dry spells frequency is meaningful for end-user decision making. (If the end user is a subsistence farming I am not sure also of the heat stress indicator)

The paper itself is well written, and the reviewer has confidence the authors can write a good paper and know the data handling in these complex models as well as the statistical methods. The section "4.3 Limitations of methods" shows they are well aware of the limitations. The objection the reviewer has is that most of these limitations are known beforehand and therefore not so much a result of the study of the data. (E.g. the choice of the A2 emission scenario)

HEAT STRESS INDICATOR âĂć While the reviewer is not a dairy expert, layman's knowhow is that: o Not everywhere in the region cattle is held for dairy production. The

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areas in which the heat stress indicator increases, according to the paper, already have limited dairy production; o Cattle by subsistence farmers is not held for dairy production mainly; the mitigation measures to be taken are limited as per current technical and financial resources for these mitigation farmers. The reviewer did not look it up, but assumes that most dairy is produced in large scale farmers. This does not deny that the dairy taken from cattle which are held for purposes of meat production as well, does form a dietary supplement for the subsistence farmers considered. o A cow is a cow, whether it is from a subsistence farmer or from a large scale farmer; it will be affected similarly by the heat stress indicator, while the large scale farmer may be more recipient to the heat stress indicator seasonal predictions and may have more means to act. Why emphasize that this is for subsistence farmers?

DRY SPELLS INDICATOR âĂć The way in which dry spells are analysed is not clear at all. The reviewer is aware of the Markov chain relationships in rainfall occurrence, but does not see how referring to the papers (page 14756, line 4) is sufficient to explain this crucial step in the analysis of dry spells. Such a method would have to be calibrated on daily rainfall records – which are not there for the future, are they? From reading the paper, the reviewer suspects that the method is used to disaggregate monthly rainfall, but to do this it would need to be calibrated on a few daily rainfall records in the region. As far as the reviewer is aware, it has never been used to disaggregate future climate change predicted rainfall. âĂć The dry spells indicator seems to take a 10 day dry spell as severe as a two times 5 day dry spell. It does not make sense to the reviewer that both would have similar impact on tilling. âĂć Indeed, as stated in the paper, the seedlings are most vulnerable, and it would make sense to incorporate this in an indicator. âĂć Maize is mentioned as the particularly vulnerable crop. If this crop has a growing season of 120-140 days then why only study DJF?

CONCLUSION These are the main comments, which would need quite a change in the paper (or a split up in three papers). Further suggestions/comments, while reading through, are added as track changes / comments in the document itself.

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Detailed comments not given here.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 14747, 2013.