Hydrol. Earth Syst. Sci. Discuss., 11, C503–C507, 2014
www.hydrol-earth-syst-sci-discuss.net/11/C503/2014/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Seasonal predictions of agro-meteorological drought indicators for the Limpopo basin" *by* F. Wetterhall et al.

Anonymous Referee #1

Received and published: 17 March 2014

General comments

This manuscript investigates the potential of seasonal forecasts of rainfall indices relevant for agriculture in the Limpopo catchment in Southern Africa. It is generally well written, with some exceptions for some sections which would require clarification (cf. specific comments below). The topic is of particular interest and the manuscript shows the interest of doing seasonal forecasts for such latitudes. In order to make it even more convincing, it would have been good to translate skill score results into indices directly usable by decision-makers or stakeholders. Following the discussion part of the paper (Section 4.2), and without going as far as monetization, it would be interesting to have results in terms of hits, false alarms et al. for relevant thresholds taken

for example from the literature already referenced in Section 1 of the manuscript (e.g., Baron et al., 2003; Nyakudya and Stroosnijder, 2011).

Specific comments

1. P865 L2-4: This statement is unclear.
2. P869 L3-6: The description of the quantile mapping approach is incomplete and/or unclear: For example, I don't understand why considering steps in mm when looking at quantiles? Moreover, the last sentence is quite unclear.
3. P869 L7-13: This paragraph is also not quite clear to me (probably as a consequence of the previous comment).
4. Table 1: I'm confused here about several things: (1) what is the exact relation between number of dry spell and the frequency of dry spells? Please specify what is your variable of interest and stick to it throughout the paper. (2) What are the numbers in this table? Are they the median values of the forecasts averaged over all locations? Why not using (as well) the CRPSS values, given that you mentioned earlier that you will use this performance score?
5. Figure 5: Again I'm confused here by what is exactly the spread shown here. How do you define a spread for CRPSS? Is it a confidence interval from a bootstrap resampling (looks like very wide if yes)? Or is it a spatial spread? Please make it clearer. A similar comment applies to Figure 6.
6. Could you comment on the possible specificities of the hindcast period considered here (1981-2010)? Is it representative of a longer historical period?

Technical corrections

1. P863 L9: “vulnerability rainfall variability”?
2. P864 L10-12: Please briefly define and give a reference for readers not familiar with this index
3. Fig. 1, legend: Please add the definition and reference for IGBP
4. Fig. 2, legend: “from from”
5. Fig. 2, legend: SYS4 has not been defined yet
6. P867 L7: The reference is actually Balsamo et al. (2010)
7. P867 L17: Please add a reference for SAFRAN, e.g. Vidal et al. (2010)
8. P868 L12: Please define and give a reference for ORCA1
9. P869 L1: the quantile mapping approach has not been used in Maraun et al. (2010), as this is a review paper; Please rephrase.
10. P869 L21-22: “assume” “assumed”, please rephrase
11. P869 L22&23: please remove “Eq.”
12. P871 L6: I believe N = 30 here (number of years). Am I right?
13. P871 L13: Please recall that 15 is also the size of the hindcast ensemble.
14. Section 3.1 & 3.2: Specify the (non) area filtering.
15. Table 1: please repeat the observed value across columns

16. Figure 5, y axis: “length of dry season”? “longest dry spell”. Please be consistent over the paper. More generally, if what is shown here is the CRPSS, it should appear as such on the y-axis.
17. P873 L4-5: Please rephrase.

References

- Balsamo, G., Boussetta, S., Lopez, P., Ferranti, L. (2010) Evaluation of ERA-Interim and ERA-Interim-GPCP-rescaled precipitation over the U.S.A. ERA Report Series, 5, pp10
- Barron, J., Rockström, J., Gichuki, F., Hatibu, N. (2003) Dry spell analysis and maize yields for two semi-arid locations in east Africa. Agricultural and Forest Meteorology, 117, 23-37, doi:10.1016/S0168-1923(03)00037-6, 2003
- Huffman G. J., Adler, R. F., Bolvin, D. T., Gu, G. (2009), Improving the global precipitation record: GPCP Version 2.1, Geophysical Research Letters, 36, L17808, doi:10.1029/2009GL040000
- Maraun, D., Wetterhall, F., Ireson, A. M., Chandler, R. E., Kendon, E. J., Widmann, M., Brienen, S., Rust, H. W., Sauter, T., Themessl, M., Venema, V. K. C., Chun, K. P., Goodess, C. M., Jones, R. G., Onof, C., Vrac, M., Thiele-Eich, I. (2010) Precipitation downscaling under climate change. Recent developments to bridge the gap between dynamical models and the end user. Reviews of Geophysics, 48, RG3003. doi: 10.1029/2009RG000314
- Nyakudya, I. W., Stroosnijder, L. (2011) Water management options based on rainfall analysis for rainfed maize (Zea mays L.) production in

Rushinga district, Zimbabwe, Agricultural Water Management, 98, 1649-1659. doi:10.1016/j.agwat.2011.06.002

- Vidal, J.-P., Martin, E., Franchistéguy, L., Baillon, M., Soubeyroux, J.-M. (2010) A 50-year high-resolution atmospheric reanalysis over France with the Safran system. International Journal of Climatology, 2010, 30, 1627–1644. doi: 10.1002/joc.2003

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 861, 2014.