

# ***Interactive comment on “Statistical Analysis for Satellite Index-Based Insurance to define Damaged Pasture Thresholds” by Juan José Martín-Sotoca et al.***

## **Anonymous Referee #3**

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This paper addresses the current use of NDVI values to assess insurances in agriculture and proposes a different approach to select the threshold values that relate to crop damage. The use of distribution functions other than the normal distribution is analysed on a NDVI time series obtained from 6-MODIS pixel sample (500 m x 500 m) in a study site in central Spain during 2002-2017. The topic is relevant due to the increasing occurrence of extreme conditions of drought on different time scales, and the need to monitor damage stages in a efficient way for both the insurance companies and the clients. The paper is generally well written and clearly presented, and the results show how the normal distribution assumption does not always hold. However, there are some limitations to recommend publication in its current version related to

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some clarification to be done. English usage is generally good, although some final checking is recommended.

Specific comments:

1. A large fraction of the introduction is devoted to present how insurances based on indexes are being used and what constraints the indexes may have to accurately trace the damage level. However, the core (as the objective states) of the work is characterizing NDVI distribution functions; the introduction should also include a review of different works done on this, no matter for what application this was done, and what functions better succeed in reproducing the statistical behaviour of this variable on different time scales.
2. Additionally, the introduction should also refer to what limitations assuming the normal distribution has for NDVI characterization.
3. This being said, I think the objective should be more specific. On what time and spatial scales NDVI is defined for the work to be done? The variable should be very precisely defined.
4. I wonder how representative the presented study case is for the generalization of the results and conclusion. Different decisions made to develop this work should be justified: crop to evaluate, location, number of pixels, sensor... Why only some pixels and not the whole crop area?
5. The choice of the candidate functions (see Table 3) must also be justified.
6. Lines 441-444. This assertion is highly dependent on how representative the studied sample is of the case referred to, and to the general problem the paper wants to address.
7. From the figures in the Annex it is not so clear that GEV has an overall better performance than the normal choice. In fact, in different examples both perform very similarly.

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8. I was expecting to find in the results more depth regarding the impact that a different distribution has on the parts (insurance companies and clients). At the end, even if statistically another function performs better than the normal assumption, the relevant issue is how much the benefit/loss is changed by this. A better performance might have only a minor impact on the final result in the insurance context. At least some estimation should be included.

9. Additionally, no discussion is done on other works in the results regarding the insurance context.

Minor comments:

10. Please, check that captions of tables and figures are self-explanatory (see for instance Table1; provide study period)

11. The weather variables statistics included in Table 1 just presents the local climate. Is it possible to combine this information with the NDVI monitoring to obtain better indexes or to validate the NDVI results?

12. Line 246. "...the completed station of meteorological networks". What do you mean by that?

13. Lines 306-311. What is the purpose of the last sentence?

14. Line 367. Please, define this more precisely.

15. Line 371. I think the definition of VR can be more clearly expressed. Additionally, the use of tables for VR intervals results in too long and repeated content.

16. Contents in lines 367-376 and 415-432 should be moved to the Methods sections.

17. Line 451. I would suggest not to use the future tense here.

18. Please, check the references' format meets the Journal's standards.

I hope the Authors find these comments useful and that they contribute to improve the

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impact of the work done.

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