

## ***Interactive comment on “Establishment and characteristics analysis of a crop-drought vulnerability curve: a case study of European winter wheat” by Yanshen Wu et al.***

### **Anonymous Referee #1**

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This paper uses the drought vulnerability curves with three key points to assess wheat drought vulnerability in European area. The vulnerability curves are divided into five clusters and are compared with environmental variables. The utilization of key points and clustering classification of vulnerability curves is a good way to analyze crop drought vulnerability and its spatial distribution. However, the English writing of the manuscript should be improved. Some sentences are hard to understand. In addition, the definition of drought index is not clear. More explanation should be added. Therefore, the following questions should be modified before publication. There is no systematic introduction to the basic information of the Erosion-productivity Impact Calculator (EPIC) model or the research progress of this model in crop drought field. The

C1

exposition of the theory and practice progress regarding crop drought vulnerability is insufficient in this research. It needs to be supplemented with a large amount of literature, especially those in the past 15 years, to discuss the historical research process of vulnerability assessment, which is from the single index to the linear index, and then to the curve index. The time series of meteorological data is too short to prove the credibility of the vulnerability simulation results. The spatial resolution of crop yield data is inconsistent with the spatial resolution of the simulation evaluation unit. It brings uncertainties to the verification of the model and the localization of crop parameters, which affects the credibility of the research results and needs to be further improved. The drought index method based on the crop model has been proposed and applied in many papers. The author needs to explain the improvement of the method in the paper. If there is no further improvement, it is necessary to mention the citation references. The manuscript lacks uncertainty analysis of this model and vulnerability assessment results, which reduces the credibility of the manuscript and needs further improvement. Minor comments: Page 3 Line 19-20: more explanation should be added for 'the third order' and 'the second order' Figure 2: Symbols should be explained in the legend Equation 2: How drought index is defined? Reference should be added. Page 7 Line 7-8: How are five levels of CLr defined? There is no detailed numbers. Page 8 Line 13-14: This sentence is not clear.

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C2