Response to RC2:

The paper presents a case of study of the drought risk of maize in Northern China based on physical vulnerability assessment. The physical vulnerability curve was constructed from the relationship between drought hazard intensity index and yield loss rate. The risk assessment of agricultural drought was conducted from the drought hazard intensity index and physical vulnerability curve. Drought hazard intensity index estimation is based on the daily water stress from EPIC model and yield loss contribution rates for different growth stages. Based on the distribution of drought hazard intensity index, the drought hazard intensity index in different regions was analyzed. Then, the yield loss ratio was obtained from the difference of yield with two different scenarios (sufficient irrigation and no irrigation). A Logistc model was used to simulate the physical vulnerability curve of crop from the relationship between hazard and loss.

According to the physical vulnerability curve, both the physical vulnerability assessment and risk assessment of yield loss ratio were analyzed. The topic of the paper is interesting and the manuscript is well written. I proposed the publication after some minor revisions.

General Comments:

1) It is important to include in some part of the introduction the differences about hazard, vulnerability and risk, because sometimes are used indistinctly. For example, the author can use as basis the terminology used by UNISDR (https://www.unisdr.org/we/inform/terminology).

We thank the reviewers for the suggestions. In the revision, the differences about hazard, vulnerability and risk have been added in the introduction part. The hazard is called a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR, 2009). The risk is defined as the combination of the probability of an event and its negative consequences (UNISDR, 2009). Initially, vulnerability was defined as the human response to hazard events (Blaikie and Cannon, 1994;FAO, 2001). Gradually, vulnerability is added with some new meanings including the different systems of human society responding to hazard, the interaction process of multi-factors like nature, society, economy and environment (UNDP, 2004) , the sensitivity or susceptibility to hazards and the capacity to cope and adapt to hazards (IPCC, 2014).

2) It can be seen in figure 5 that the drought hazard intensity index has a cyclic behavior with a return period of 20 years aprox. How is this considered in the risk assessment?

In Figure 5, there exist two extreme drought hazards in 1980 and 2000 with the average of drought hazard intensity index larger than 0.8. For other years, areas with the drought hazard intensity index larger than 0.5 mainly centered in the west part. A cyclic behavior with a return period of 20 years aprox appears from 1965 to 2000. It show the periodicity of the extreme drought event and can be used as the reference for the prediction of drought hazard.

3) It could be illustrative to include in the conclusions the weaknesses and limitations of the approach.

We thank the reviewers for the suggestions. Some revision has been made in discussion and conclusion part.

The uncertainty of this study mainly comes from the simulation of EPIC model and the construction of physical vulnerability curve. For EPIC model, the uncertainties are from the

model itself and input data like meteorological data, soil data and field management data. For the construction of physical vulnerability curve, the uncertainty is mainly due to the limitation of selected sceneries.

For the further study, a larger study area including south and north part of China will be selected to better assess drought risk and describe the impact of climate change to agriculture along different latitudes.

4) It is difficult to read some figures because the size of labels is too small.

In the revision, the size of labels have been adjusted to be larger.