

Interactive comment on “Early warning and drought risk assessment for the Bolivian Altiplano agriculture using high resolution satellite imagery data” by Claudia Canedo Rosso et al.

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The manuscript aims at developing an agricultural early warning for crop production in the bolivian Altiplano. Bolivian Altiplano is an arid region where ENSO related drought events may lead to severe economic-social consequences, as it happened in the early 80s and the mid 90s. The manuscript compares some data from meteorological stations with satellite data, and analyzes its correlation with ENSO. Although the data is interesting (and the idea is interesting too), I'm afraid the manuscript has some deficiencies. The manuscript does not propose an early warning system The proposed correlations are too weak to provide confident prediction

C1

Main comments:

1. The term early warning usually refers to a time anticipation; X time before a given event the warning is emitted. In the present case, readers would expect to see the NDVI or ENSO conditions that represent a high probability of drought some months before the drought. For instance, if the September ENSO is X, there is a Y probability of drought. However, the article doesn't show any early warning. The article only analyzes the some ENSO relationships, which is nothing new. Several previous researchers (not referenced in the literature review) have already analyzed the relationship between ENSO and crop production in South America (Izumi et al., 2014; Anderson et al., 2016). Moreover, previous studies have already proposed ENSO based crop management policies in South America (Ramirez-Rodrigues et al., 2014)
2. It is not clear which satellite data was used. The title suggests “high resolution”, but the manuscript mentions 0.05 degree (about 5 km). The term high resolution satellite imagery usually refers to less than 90 m or 50 m resolution.
3. The manuscript only shows the results of 1 correlation for 1 station (NDVI correlation for Tihuanacu), which is supposed to be the one with the highest correlation (Pg9 Ln21). This brings several doubts. *How is the correlation in other locations? (Maybe a thematic correlation map would be more appropriate) *Even though Tihuanacu has the highest correlation, the correlation is still quite weak (0.41). Does it means that the other correlations were even lower? *Manuscript states that it considered 23 stations, most them located in La Paz. But then it presents an average value for each department. This procedure is not appropriate for several reasons. For instance: a) It is not fair to compare the average of La Paz (more than 15 stations) with the average of Potosi (only 3 stations poorly distributed) b) In the present methodology the stations were clustered based on political boundaries. Does it mean that bolivian climate behaves according to its political boundaries? I don't believe so. For instance, the stations near Titikaka lake (in La Paz) have very different climatic characteristics than other stations also in La Paz (for instance El Alto or Santiago de Machaca).

C2

*The correlations from FigA6 are different than the values from Table 2 (because of rounding decimals).

*Manuscript states that Tihuanacu has the highest correlation, but Table 2 shows that Potosi has higher correlation.

*The highest correlation (0.51) is still a weak correlation. What is the confidence of a prediction based on such a weak linear correlation? What would be the confidence of predictions for Oruro based on a linear correlation of 0.12? Unfortunately, it seems that the present results suggest that the present methodology does not provide a reliable drought estimations.

References: Izumi et al., 2014. Impacts of El Niño Southern Oscillation on the global yields of major crops, *Nature Communication*

Anderson et al., 2016. Life cycles of agriculturally relevant ENSO teleconnections in North and South America, *International journal of climatology*, 37, 3297-3318

Ramirez-Rodrigues et al., 2014. Tailoring wheat management to ENSO phases for increased wheat production in Paraguay, *Climate risk management*, 3, 24-38.

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