

Brazil is the world's largest sugarcane producer, and accurate estimates of the distribution, harvest area of sugarcane are crucial for sustainable sugarcane production and national food security. The study "High-resolution map of sugarcane cultivation in Brazil using a phenology-based method" aims to identify the harvest area of sugarcane in Brazil by a phenology-based method (TWDTW). The annual 30-m spatial resolution sugarcane harvest maps (2016-2019) for 14 states in Brazil have been generated with very high accuracy (over 98%).

In terms of the method, I have some concerns.

### 1. The field sample data.

The authors used the Google Earth images to select the sugarcane samples without any ground truth samples as references, so it is difficult to tell the crop types. Meanwhile, the authors did not describe the rules of visual interpretations. It is hard to tell the accuracy of the sugarcane samples selected.

In addition, the NDVI curves were used to select sugarcane samples, but later the selected sugarcane samples were used to extract the standard sugarcane NDVI curves to develop algorithms for sugarcane mapping. Therefore, I am confused that there was a little self-proof and not sure about the accuracy estimated based on these samples.

As these samples were selected by Google Earth images rather than filed truth data, it is not reasonable to call these samples as "filed data".

### 2. The TWDTW method for sugarcane mapping

In this work, the "difference" between the maximum NDVI value in the growing season (NDVImax: mean value of the two maximum NDVI in the growing season) and the minimum NDVI value in the non-growing season (NDVImin: mean value of the two minimum NDVI in the non-growing season) was calculated for each pixel. The "difference" as a criterion to map the sugarcane in Brazil. The evidence was shown as "the differences in NDVI between the growing season and non-growing season for these vegetations were lower than those for sugarcane" in lines of 177-178. Here, the vegetations compared mainly include grassland, seasonal forest, and grazing areas as shown in line of 175.

My main concern is that the difficulty of sugarcane mapping is to separate sugarcane from other crop types within agricultural system rather than vegetations in other ecosystems such as grassland and forest. This evidence cannot prove the criterion used in the sugarcane mapping is robust.

### 3. The "distance" and "difference" thresholds for identifying sugarcane

See lines 185-190, the agricultural statistical harvest area for sugarcane at the state and municipality levels have been used to determine the "distance" threshold and optimize the "difference" threshold, however, the statistical data were used to compare with the resultant sugarcane areas. To some extent, this approach is self-proof.

What's more, statistical data cannot present the spatial patterns of the sugarcane fields. Therefore, I doubt the ability of this approach to describe the spatial information of the sugarcane distribution in Brazil.

Minor:

1. Time-weighted dynamic time warping (TWDTW) method

TWDTW is the method used in this work to map sugarcane, but the description of the method is not detail.

2. Sugarcane in Brazil covers an extensive harvesting period, how were all the possible standard NDVI curves collected in Figure 5?

3. It is needed to provide more details about the method. In addition, more descriptions are needed about the flexible phenological and harvest conditions of sugarcane in the TWDTW in lines of 165-167.

4. In lines 170, how the possible “distance” values have been calculated? Please give more explanations here.