

Authors' Response to Short Comment by Mr. Liu

Comments: The paper discussed the role of the water availability in the vegetation phenology of semi-arid regions. The remote sensing data, observed temperature and precipitation, and soil moisture database from the hydrological model are employed in the paper. In capturing grassland spring phenology, the study shows the soil moisture based index is better than the precipitation based index. Both of the method and the results are useful for the relative researchers. In the paper, there are many abbreviations in the paper, such as SMSO, PSO, TSO and others. If the full name are used in the "4 Discussion and conclusions" and captions of figures, such as in Figure 10, 11 and 12, it would be helpful to understand the paper. In Fig. 1, the legend of scale should be replaced by a clear one or deleted.

Your suggestions about the captions and Fig. 1 are appreciated and accepted in the revised manuscript with pleasure.

We deleted the scale bar in Fig 1, please check Fig. 1 in the revised manuscript.

The following is the revised captions:

"Figure 9. Time series of SMSO (Soil Moisture Spring green-up Onset date), PSO (Precipitation Spring green-up Onset date), TSO (Thermal Spring Onset date), and GUD (Green-up Onset Date) at station numbered 10

Figure 10. Trend of correlations between GUD (Green-up Onset Date) and PSO (Precipitation Spring green-up Onset date)/SMSO (Soil Moisture Spring green-up Onset date) among meteorological stations along a gradient of HAI (the solid circle is the correlation between GUD and PSO, the hollow triangle is the correlation between GUD and SMSO)

Figure 11. Correlation coefficients between NDVI-derived GUD (Green-up Onset Date) and regressed GUDs by assuming different dominant indices among the meteorological stations."