



Comment on cp-2021-5

Anonymous Referee #2

Referee comment on "Monitoring landcover change and desertification processes in northern China and Mongolia using historical written sources and modern vegetation indices" by Michael Kempf, Clim. Past Discuss., <https://doi.org/10.5194/cp-2021-5-RC2>, 2021

Using historical written sources, palaeoenvironmental data, and Normalized Difference Vegetation Index (NDVI) temporal series to compare landcover change during the Little Ice Age and the reference period 2000-2018, could help us to understand the role of climate in affecting grassland. Surely, you have done a lot of work, but before further consideration, I have several questions at present.

1)" Figure 3 further visualizes the historical route patterns and the daily camps of the travels of Pater Gerbillon from 1688. From these route reconstructions, a cross-validation of hermeneutic sources and modern landcover and climate data was derived." Why modern landcover and climate data was derived from these route reconstructions? In you text, landcover in 2019 was derived from Landsat-OLI-8 satellite imagery. In addition, as we know, from 1688 to now, landcover may be changed many times.

2)"Climatic conditions were reported to be very dry and extremely cold during October 1688, which aligns with the climatic tendency towards a drier and colder period around 1700 AD and the climate depression during the Maunder Minimum of the LIA. From the palaeoenvironmental reconstructions, 1688 can be considered an extremely anomalous year compared to the long-term average and marks the transition into a generally colder and drier phase that lasts until about 1715 AD." From this, climate of 1688 is clear, and then is it necessary to reconstruct?

3) In aird and semi-arid area, plant growth may be more close to heavy precipitation events but not to total precipitation as presented in Figure 9.

4) "According to written sources, the year was characterized by extremely low temperatures during late grazing season of September and the onset of October and extremely dry conditions and severely high temperatures during summer rainy season, which caused massive perish of livestock in the region." From what you can say 'perish'?

5) "Around the reconstructed route, a 20 km buffer was created to visualize the historical environmental conditions within a suitable range". Surface conditions are various under various toporograph. For example, with 20 km buffer, there are various landscapes, such as cropland, forest, grassland, shrubland, and waters. Can surface conditons from camps

extend to 20 km?

6) If we don't know the number of population and livestock around 1688, the human disturbances on grassland degradation can not be well understood. Climate change is only one reason that can explain grassland succession.

7) "Results show that decreasing precipitation and temperature records led to increased land degradation during the late 17th century". Does this mean land degradation occurred the late 17th century? "no major grassland recovery over the past 20 years", the reference undegradation year is?