



Lake Ice Phenology Monitoring in Tibetan Plateau using Remote Sensed Data

Linan Guo (1,2) and Yanhong Wu (1)

(1) Institute of Remote Sensing and Digital Earth, Chinese Academy of Science, Beijing, China (guoln@radi.ac.cn; wuyh@radi.ac.cn), (2) University of Chinese Academy of Sciences, Beijing, China

The Tibetan Plateau (TP) is a region sensitive to global climate change, and could trigger climate variation worldwide. Numerous lakes in the TP play important roles in the climate system. And the formation and ablation of lake ice is one of the unique properties of lakes in the TP highly related to temperature variation. Thus lake ice phenology are considered as a sensitive indicator of global warming. And it also have substantial ecological impacts. In the Tibetan Plateau, remote sensing has been used as an effective tool to detect the changes of lake ice phenology, as there is limited ground observation of lake ice phenology. Because of the difference of both the sources of remote sensing and the current available algorithms, differences exist in identifying lake ice phenology. In this study, four results of lake ice phenology based on different sources of remote sensed data (MODIS reflectance data, snow product, land surface temperature data, and microwave data) are used to identify the lake ice phenology of 18 lakes in the Tibetan Plateau for the period 2002–2015. Compared the results of the four methods, it can be seen that the highest consistency is occurred in the monitoring of the completely ice-covering duration (CID), and the lake ice duration in Tibetan Plateau becomes longer from the south to the north. And we also analyzed the main climatic-environmental elements affecting the lake ice phenology. The results show that the factors, especially the temperature, play a greater role in the freezing and thawing process of the lake. The inter-annual variation trend of lake ice period of northeastern part was delayed. In the middle and northern of the plateau, the lake ice period is mainly extended.