

POTENTIAL OF DATA FUSION APPROACH ON ACCURATE ESTIMATION ON LONG-TERM GRASSLAND BIOMASS

Binghua Zhang^{a,b}, Li Zhang^{a,*}, Xun Wang^c, Shatuo Chai^d

^a Key Laboratory of Digital Earth Science, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, Beijing 100094, China – zhangli@radi.ac.cn

^b College of Resources and Environment, University of Chinese Academy of Sciences, No. 19A Yuquan Road, Beijing 100049, China – zhangbinghua13@mails.ucas.ac.cn

^c Qinghai Academy of Animal and Veterinary Science, No. 1 Weier Road, Xining 810016, China – wangxun513@163.com

^d Qinghai Academy of Animal and Veterinary Science, No. 1 Weier Road, Xining 810016, China – chaishatuo@163.com

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ABSTRACT:

The natural grassland in Qinghai occupies 15.2% of grassland areas in China. Accurate estimation of grassland biomass is of great importance for scientific use of pasture resources and understanding of regional carbon cycle. Remote sensing provides a practical way for biomass estimation. However, the currently-existed remote sensing data hardly contains information with both fine spatial and temporal resolution and has the limitation to make precise sequential estimation of biomass in grasslands regions with high spatial heterogeneity. In this study, we used data fusion approach (STARFM and sparse representation) to blend 16-days 500m MODIS data with 30 m TM data, and acquired long-term synthetic data with both fine spatial and temporal resolution. We then compared the two data fusion approaches and chose the fused data with higher accuracy. Incorporating the fused data with field-sampled data and other auxiliary data (e. g. DEM, climate data, land cover data), we developed several models with different approaches (e. g. linear/ nonlinear regression, neural network, support vector machines, K-nearest neighbor) for grassland biomass estimation near Lake Qinghai. We finally decided the optimal model with best performance to generate grassland biomass data at 16-day intervals and 30m resolution during the growing season in 2000-2014. Our study indicates that the data fusion approach can be effectively applied on detection of pasture growth and conditions. It may help the decision makers to make better decision, and utilize pasture in a more scientific way.