



Estimation of lake water storage change and its linkage to increased mass on the Tibetan Plateau

Liping Zhu (1,2,3) and Baojin Qiao (1,3)

(1) Institute of Tibetan Plateau Research CAS, China (lpzhu@itpcas.ac.cn), (2) CAS Center for Excellence in Tibetan Plateau Earth System, Beijing, China, (3) University of Chinese Academy of Sciences, Beijing 100049, China

In this study, we estimated water storage change of 282 lakes ($> 10 \text{ km}^2$) by an empirical equation based on Shuttle Radar Topography Mission (SRTM) DEM and Landsat images in the endorheic basin of inner Tibetan Plateau (ITP). Lakes water storage had increased by 107.5 Gt (8.27 Gt/y) from 2000 to 2013, 89.4 % of increased water storage was mainly concentrated in four regions and 126 large lakes ($> 50 \text{ km}^2$) occupied 90.6 % of total water storage change. Mass increased rate of ITP was 4.38 Gt/y derived from Gravity Recovery and Climate Experiment (GRACE) satellite data during 2003-2009, which could explain 53 % of lake expansion. A little contribution to lake from permafrost degradation based on Active-layer depth (ALD) model. Increased glacial meltwater with rising temperature, which didn't increase mass of ITP, made an equivalent contribution to lake expansion with precipitation and evaporation.