



## **Long-Term Changes of Typical Lake Basin in Tibetan Plateau Using Remote Sensing Data (1980-2010)**

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The environmental factors including snow cover, vegetation and hydrologic regime of lake are all sensitive factors and can reflect ecosystem responses to changing climate. A series of satellite-based environmental data archives including variation of snow cover, vegetation phenology and lake level, together with the in situ observation data were used to monitor and simulate the variation of typical lake basins in Tibetan Plateau for the period 1980-2010. Nam Co Lake is the highest lake in the central Tibetan Plateau and there was no any meteorological observation station or hydrological station in the basin before 2005. We chose Nam Co Lake as a typical study region and our results are including:

(1) We provide a method for estimating the lake water storage based on historical meteorological records from 1976 to 2009, remote sensing images scattered in this period, in situ bathymetric survey, and GIS techniques, and presents a comprehensive 34-year analysis of intra-annual and inter-annual variations of Nam Co Lake water storage.

(2) A series of satellite imagery-based environmental data archives including variation of snow cover, vegetation phenology and lake level in Nam Co Lake Basin, were mapped.

(3) Simulation of lake level variation (1980-2010) has been conducted through modeling at a monthly time step for the first time and the contemporaneous water storage series was acquired, based on the satellite altimetric data, meteorological data and the in-situ bathymetric survey data.

(4) We calculated the evaporation on the Nam Co Lake using Energy balance method and Morton complementary method. The results show that the average evaporation per year is 1261.46mm during 1980 to 2010.

The comprehensive analysis of the lakes in Tibetan Plateau indicate that there is the spatial difference for the enlarging or shrinking status of the lakes in TP. Satellite observations, which are publically available and of high quality, are a powerful tool for monitoring the state of the lakes in TP, as well as other ungauged, remote and hard to access regions. The inland lakes which depend on the rainfall and river supply in the basin are shrinking, while the lakes which depend on glacial meltwater supply are enlarging. Climate change is an important factor promoting the lake variation.