



## Lake volume monitoring from space

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Lakes are integrator of environmental changes occurring at regional to global scale and present a high variety of behaviors on a variety of time scales (cyclic and secular) depending on the climate conditions and their morphology. In addition their crucial importance as water stocks and retaining, given the significant environment changes occurring worldwide at many anthropocentric levels, has increased the necessity of monitoring all its morphodynamics characteristics, say water level, surface (water contour) and volume. The satellite altimetry and satellite imagery together are now widely used for the calculation of lakes and reservoirs water storage changes worldwide. However strategies and algorithms to calculate these characteristics are not straightforward and need development of specific approaches. We intend to present a review of some of these methodologies by using the lakes over the Tibetan Plateau to illustrate some critical aspects and issues (technical and scientific) linked with the survey of climate changes impacts on surface waters from remote sensing data. Many authors have measured water variations using the short period of remote sensing measurements available, although time series are probably too short to lead to definitive conclusions to link these results directly with the framework of climate changes. Indeed, many processes beyond the observations are still uncertain, for example the influence of morphology of the lakes. The time response for a lake to reach new state of equilibrium is one of the key aspects often neglected in the current literature. Observations over long period of time, therein maintaining a constellation of comprehensive and complementary satellite missions with a continuity of services over decades, especially when ground gauges network is too limited is therefore a necessity. In addition, the design of future satellite missions with new instrumental concepts (e.g. SAR, SARin, Ka band altimetry, Ka interferometry) is also suitable for complete monitoring of continental waters.