



Combining Sentinel Satellites to Monitor Water Level Variation in Namco, Tibet

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Lake level over the Tibetan Plateau (TP) has experienced significant changes in the past two decades. Most of them are increasing arguably in response to the current global warming episode that leads to an accelerating melt of alpine glaciers and permafrost. The increasing rate can be observed from a multidecadal time series provided by satellite altimetry data. However, the spatiotemporal characteristic of altimetry mission's frozen ground tracks is one of major limitations in the coverage of lakes over TP. Also, the intermission bias between radar altimetry satellites, such as Envisat, Jason series, SARAL/AltiKa, and Sentinel-3 is another concern while adjusting the discrete time series. In this study, we use Landsat and Sentinel-1/-2 imaging satellite and a DEM to recover the historical water level variation of Namco on TP, by using the Thematic Imagery-Altitude System (TIAS) approach. This method utilizes waterline positions from classified water bodies in each image and calculates geoidal heights from a co-registered DEM. The lake level information is further compared with Envisat, SARAL/AltiKa, and ICESat laser altimetry measurements to estimate relative accuracy. A preliminary result from Sentinel-3 SAR mode is also discussed to extend altimetric time series and to fully explore the potential of integrating all Sentinel missions in terrestrial water studies.