

Crustal Flexure Around Siling Co Lake in Tibet observed by InSAR Time Series.

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Altimetric measures combined with the monitoring of the lake surface show that the water level in the lake Siling Co in Tibet increased suddenly by about 0.8m/yr from 2000 to today, after being more or less stagnant since 1973. This increase acts as a load on the lithosphere and provides an opportunity to study the tibetan lithosphere response to stress. The resulting deformation is observed by InSAR using the available ERS and Envisat SAR data set from 1992 to 2010. The interferograms covering the period 2000-2010 show a clear deformation pattern, centered on the lake, and with an amplitude reaching 5 mm/yr on the shores. The interferograms covering the period 1992-1999 do not present clear lake-related deformation. After temporal series analysis, the signal amplitude closely follows the lake level variations with time. However, the amplitude of the modelled elastic deformation is about 1.8 times too low with respect to the observed signal.

The SAR data set is made of 28 and 28 ERS and 23 and 28 Envisat acquisitions on two descending tracks, and on 9 Envisat acquisitions on one ascending track. The NSBAS chain, from raw SAR images to coregistered differential interferograms in radar geometry, is applied to each acquisition geometry separately. A small baseline network of interferograms is constructed on which we allow strong redundancy. Differential interferograms are affected by strong temporal decorrelation, probably mainly due to freeze thaw cycles North of the lake, and grass-like vegetation in the lake area. Spatial and temporal decorrelation, DEM errors and stratified atmospheric delays in the highest relief areas makes unwrapping challenging. We thus correct for residual phase ramps and stratified atmospheric delays prior to filtering and phase unwrapping.