

Water Level Variations of Bosten Lake Measured with Satellite Altimetry and Satellite Gravity mission

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Abstract About 10 yr (1992-2002) of TOPEX/Poseidon(T/P) and 6 yr (2002-2008) of Jason-1 altimetry data which have been assimilated, corrected, edited, reduced and filtered, have been used to compute time series of lake levels at Bosten lake in the west China. The time series is analyzed with Fourier transform and wavelet transformation, respectively. The mean periods are 1034d, 363d, 182d and 47d. The seasonal variation are the main component, the amplitudes of the annual and semiannual are 0.7196m and 0.5322m respectively based on the least square approach. So annual is the dominant period of the seasonal variation, semiannual is the minor period. The trend of the water level variation of Bosten Lake is 0.2012m/a, which indicates the water level of Bosten Lake is rising. Also GRACE monthly gravity field models are used to monitor the changes of gravity anomaly at Bosten Lake. After cutting off and Gaussian smoothing the gravity field models, the changes of gravity anomaly also is analyzed with Fourier transform and wavelet transformation, respectively. The mean periods of changes of gravity anomaly are 1028d, 358d, 177d and 52d. The correlation between the variation of lake level and changes of gravity anomaly at Bosten Lake is analyzed. Correlation coefficient is 0.884 that indicate it is of high level of consistency for variation of lake level and changes of gravity anomaly at Bosten Lake.

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