A joint inversion method which allows simultaneous determination of Lg wave attenuation and site response from spectral amplitude ratios was developed and applied to invert the parameters of Lg wave attenuation and site response in northern China. Four hundred and four earthquakes occurred in the area of 37°N-41°N, 113°E-120°E, with magnitude $M_l$ ranging from 1.7 to 5.4, were selected for this study. In total 1500 three-component recordings recorded in 81 stations in the northern China area from 2006 to 2008 were used in the inversion. The parameters of site response and Lg attenuation were calculated with a frequency interval of 0.2 Hz in the frequency range of 1 Hz to 6 Hz. The results obtained indicate that there is remarkable lateral heterogeneity on Lg wave attenuation in the study area. Higher $Q_0$ values are related to the tectonic uplift regions, lower $Q_0$ values to the tectonic depressions, and moderate $Q_0$ values to the areas where the wave propagating paths passed through both the uplift and depression regions. The site effect for the base rock is stable and flat in most of the frequency range while that for the base soil is higher than that for the base rock. For the same soil station, the amplification of low-frequency waves is higher than that of high-frequency waves. For both the site response and attenuation no significant difference was observed in different components.