On May 12, 2008, a disastrous earthquake of magnitude 8.0Ms occurred in Wenchuan, Sichuan province, China, killing more than 69,000 people and injuring over 370,000 people. There are some GPS monitoring networks with more than 100 points distributed around the earthquake region. Most of them were resurveyed in 2005, 2006, and 2007 and all of them were resurveyed after the earthquake. We use the movement velocities of GPS stations obtained by GPS measurements before the earthquake to determine the distribution of horizontal strain accumulation with a piece-wise approximation approach, and the coseismic displacements obtained by GPS measurements before and after the earthquake to determine the fault slips of the earthquake with an inversion analysis method. The results show that the distribution of the principal strain rates is strongly related to the active faults in the region, but along Longmengshan fault where the earthquake occurred, the strain rates are much lower than the others. The fault slip distribution shows that the earthquake-induced fault movement is mainly a thrusting with dextral striking, and the fault slips in the upper parts of the fault plane are in general bigger. Using the current strain accumulation rate and the released energy by the earthquake, we predict such a big earthquake in Longmengshan fault zone will happen in 460 to 1380 years.