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The seismic deformation analysis to strong earthquake clusters in Jiashi area considering the earth structure

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It had broken out a serious large earthquakes more than 6.0 magnitude in Jiashi area after the 6.9 magnitude earthquake in Artux area in Xinjiang province on 19th, March, 1996, where had broken another large earthquake about 6.8 magnitude near Jiashi-Bachu regions on 24th, February, 2003. This strong earthquake clusters are densely concentrate at 55 kilometer length and 30 kilometers width area with 17~30 km depth (Yang Xin, 1998) at the northwestern Tarim basin. The sedimentary of seismic area are thick, without surface rupture and explicit active motion. The seismic source area of several large earthquakes is no more than 20 by 30 km (Shan Jianxin, 2002). The seismic mechanism of Ms 4.5 to 5.9 magnitude from 1997 to 1998 indicate that seismic faults are mainly strike slip and normal fault type to middle and weak earthquake in Jiasha strong earthquake clusters, while the 6.8 magnitude earthquake in 2003 presents the thrust fault type which is nearly the same with the 6.9 magnitude earthquake of Artux in 1996.

In this paper, the seismic deformation has been studied using the observation data get by about 40 GPS monitoring station in Jiashi and adjacent area from 1994 to 2001, especially focused on co-seismic and post-seismic deformation. Considering the earth stratified structure and viscoelastic medium, the dislocation parameters of seismic fault have been inverted out. The co-seismic deformation and post-seismic accumulated deformation has also been discussed due to the strong earthquake clusters. Finally the viscoelastic crust characteristic of this area has been inverted out and made specific analysis based on the historic crustal structure information too.

Keywords: seismic deformation; earth stratified structure; viscoelastic medium; strong earthquake clusters; Jiashi area.

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