INVESTIGATING CO-SEISMIC DEFORMATION OF THE 2008 WENCHUAN EARTHQUAKE WITH ALOS SCANSAR INTERFEROMETRIC OBSERVATIONS

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1. INTRODUCTION OF WENCHUAN EARTHQUAKE

An Ms8.0 earthquake occurred on May 12, 2008 near Wenchuan, China. The epicenter of the earthquake located at 31.0°N, 103.4°E. The disastrous event surprised the entire world. More than 69,000 people were killed and over 4.8 million became homeless. The earthquake was caused by the dislocation of some thrust faults within the Longmen Shan mountain belt, which is situated between the eastern Tibetan Plateau and the Sichuan Basin. The northeast trending Longmen Shan fault zone consists of three major subparallel faults: the western one is the Beichuan fault (BCF), the central one is the Wenchuan-Maoxian fault and the eastern one is the Pengguan fault (PGF). The surface breaks mainly along the BCF trace from Yingxiu to Qingchuan, for a total length of more than 200km[7].

2. WHY TO USE ALOS SCANSAR INTERFEROMETRIC OBSERVATIONS

In recent years, the Differential Interferometric Synthetic Aperture Radar (D-InSAR) technique has been widely used in investigating crustal deformation, which has attracted many scientists' attention. Here we use D-InSAR technique to research the crustal deformation of the Wenchuan earthquake. In the recent D-InSAR research of the Wenchuan earthquake, we can find that the interferometric results of the L-band pairs (such as ALOS PALSAR data) are better than those of the C-band pairs (such as Envisat ASAR data). The L-band interferometric pairs showed higher coherence than those of the C-band[3]. And ALOS PALSAR contains the strip-map mode and the SCANSAR mode. Up to now there are no public software packages to achieve the ALOS SCANSAR interferometric processing, so the D-InSAR results are mostly generated by the ALOS PALSAR strip-map mode acquisitions. Because the 70km swath width of ALOS PALSAR strip-map mode can not cover the entire displacement filed, the researchers use paths 470–477 to gain the interferograms respectively and then join them

together to construct a surface displacement field for the entire region[1,2,6,7]. From their interferograms, we can observe that the fringes of each path can not connect together perfectly, as is shown in Fig.2.

As can be seen from above, using the ALOS SCANSAR acquisitions is the best choice to investigate the co-seismic displacement filed of the Wenchuan earthquake. We already have had the ability to do the interferometric processing of the ALOS SCANSAR acquisitions and have acquired some fine interferograms.

3. PRELIMINARY CONCLUSIONS

Our ALOS SCANSAR interferograms are coincident with the results of ALOS PALSAR strip-map mode pairs. In this paper, we will analyze the interferometric results to find out more useful information of the peculiar earthquake. In Fig.1 we can notice that the displacement fringes begin from Yingxiu and extend to Qingchuan in the direction of northeast. This is consistent with the surface rupture along the BCF.

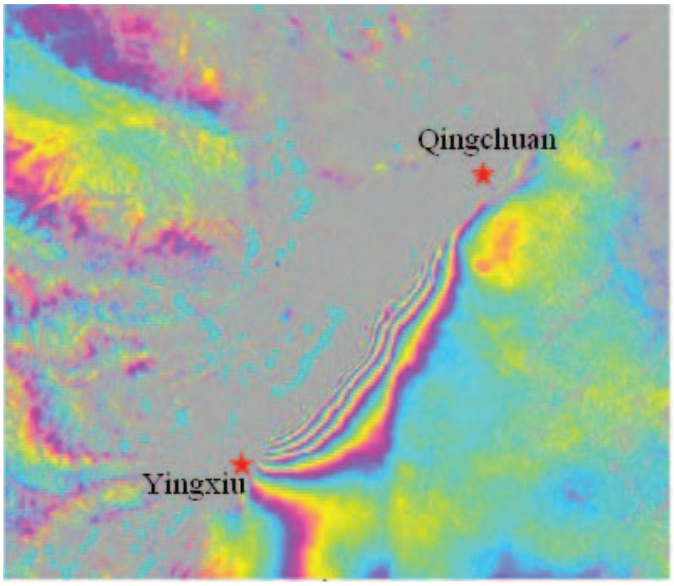

Figure.1 ALOS SCANSAR displacement fringes of the Wenchuan earthquake (our experimental result)

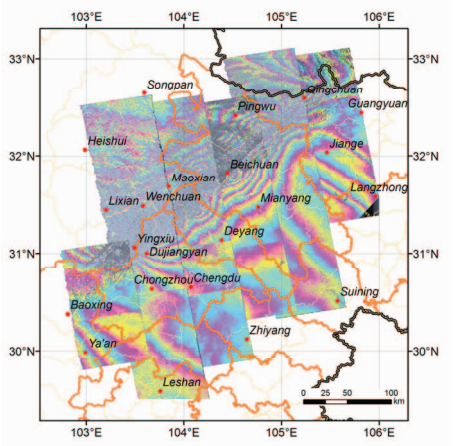

Figure.2 ALOS PALSAR strip-map mode displacement fringes[6]

4. REFERENCES

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