

Analysis of Error-Factors Contributing to 3D Displacement Components in Damxung Mw6.3 Earthquake (Tibet)

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ABSTRACT:

The Damxung Mw6.3 earthquake occurred in Damxung area of the Tibetan Plateau, located at 90.274E, 29.704N by USGS on 6 October 2008, and it caused great damage in this area.

InSAR has proved an immensely powerful tool in studying earthquakes with subcentimetric precision and unparalleled spatial. One of the InSAR limitations is that an interferogram is only sensitive to LOS displacement of the surface displacement, thereby some research focus on calculating 3D components of displacement(vertical, north-south, east-west), which can provide more information of crustal displacement processes. One method of calculating 3D components is that three observations of ground displacement can be derived from combining InSAR results of two or more different incidence angles on both ascending and descending swaths. InSAR accuracy and ill-conditioned system of equations are the major perturbing factors limiting the accuracy of 3D components, however, we lack a clear understanding on how these errors contributing to this method.

In this work, several paths of ENVISAT ScanSAR and strip images are processed to derive the LOS surface displacement caused by the Damxung earthquake, and 3D components are estimated from different combinations of ScanSAR and strip paths. Then we analyze the error-factors contributing to 3D components, our purpose is that we can indicate which error is the principal factor to this method, and whether does this method suit to estimating 3D components.