



## **Spatiotemporal evolution of transient slip on the Xianshuihe fault zone in Southwestern China**

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The Xianshuihe Fault zone is located at the eastern-boundary of the Sichuan-Yunnan Block, where is a seismically high active area with several strike slip fault zones in Southwestern China. Since 1700 there are eight earthquakes  $M \geq 7$  occurrence at the Xianshuihe Fault zone. More than 40 GPS sites are distributed around the Xianshuihe fault zone, which are part of the Crustal Movement Observation Network of China starting observation from 1994. In addition, there are 22 sets of traditional geodetic measurements starting observation in 1980s.

The method of Extended Network Inversion Filter (NIF) was introduced to analyze the time series of the geodetic data and has been developed to formally separate time-dependent deformation caused by faulting from data error and uncorrelated random walk benchmark motions contained in a geodetic data set. The fault zone is geometrical divided into rectangular fault grids, and Green Function forms the relationship between the slips of these grids and deformation of the sites on the surface. Nonlinear statistical analysis methods and Kalman filter algorithm are used to estimate the unknown parameters.

The length of the Xianshuihe Fault zone is about 300km in strike direction and its width is about 50km in dip direction. To evaluate the spatial distribution of slip, the surface of the fault zone is divided into the size of grid with 10km by 10km, the Xianshuihe Fault zone is specified as left lateral slip with no dip slip and tensile component. The direction of dip and strike are known and the Poisson's ratio is given as 0.25. The slips are obtained on the each grid, and grids with high slip rate are detected, simultaneously the surface deformation is gained caused by tectonic action.