

Co- and Post-seismic deformation due to the 2016 moderate earthquake sequence at the Chaman fault

*Fumiko Matsumoto¹, Masato Furuya¹

1. Hokkaido University

Chaman fault system, located in Pakistan and Afghanistan, forms a transform boundary between Indian and Eurasian plates. Previous geological survey found the relative velocity of the Indian plate to the Eurasian at $\sim 36\text{mm/yr}$. Chaman fault is the major sinistral strike-slip fault which has $\sim 900\text{km}$ long in the system. However, no large earthquakes ($M > 7$) have been documented on the Chaman fault. Low seismicity results from either a long recurrence interval or aseismic creeping. Recent studies indicate a heterogeneous distribution of locked and creeping segments along the fault. In previous work, Furuya and Satyabala(2008) revealed a long lasted afterslip following a moderate earthquake ($M5$) in 2005 on the Chaman fault. We examine other earthquakes on the Chaman fault and their behavior comparing with the results in Furuya and Satyabala(2008). We find two moderate events occurred on May 13 and July 10 in 2016, first events larger than $M5$ on the Chaman fault after the $M5$ earthquake in 2005. The first event on May 13 was the largest $M5$ -class earthquake since the 2005 $M5$ event examined by Furuya and Satyabala (2008). According to USGS catalogue, this May 13 event has three earthquakes observed within a few kilometers every minute in a row. We use ascending Sentinel-1 SAR data from March 31, 2016 to January 13, 2017. We generate InSAR images that suggest that the co- and post-seismic deformation of left-lateral strike-slip. Especially the second July 10 event almost implies the same behavior with the results in Furuya and Satyabala(2008). We must pick up real deformation except atmospheric trend, so we stack five InSAR images using different master date for each events before estimation of fault source model.

Keywords: InSAR, Slow slip, Crustal deformation

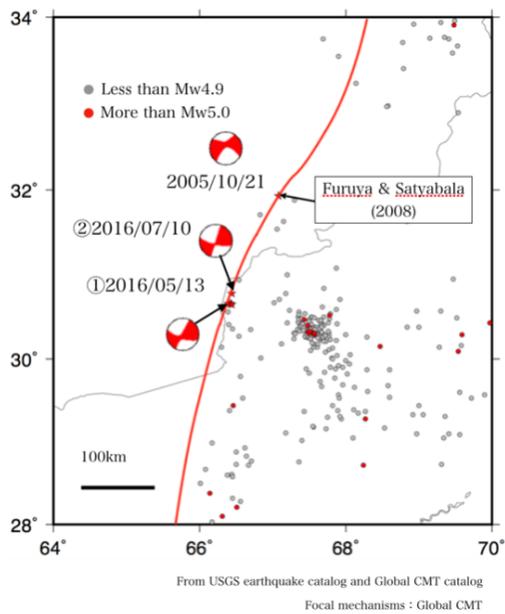


Figure1. Location map of Chaman fault and earthquakes after 2005/10/21. Gray dots show events less than Mw4.9 while red dots show more than Mw5.0. We pick up two events from more than Mw5.0 along the fault.

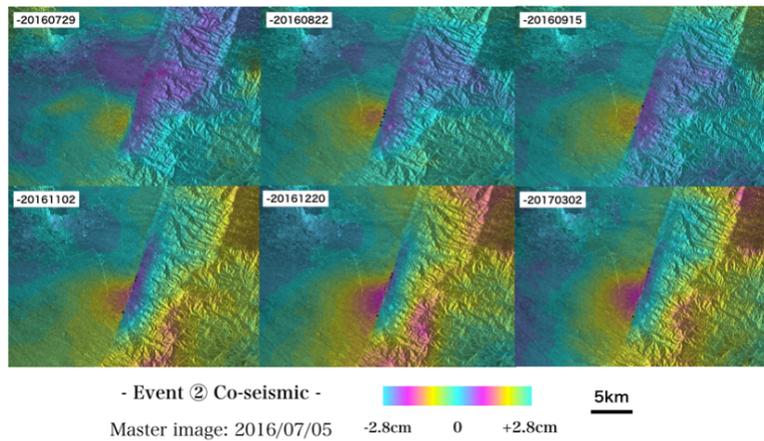


Figure2. Co-seismic deformation regarding the second event on 2016/07/10. There are six interferograms using same master image on 2016/07/05. These patterns are consistent with left lateral deformation. The phase and extent of deformation area gradually become larger.