B1: Proposal Title:

Event Supersite: 2014 Ludian earthquake, China.

B2: Persons proposing the Event Supersite

Teng Wang, King Abdullah University of Science and Technology (KAUST).

Shengji Wei, California Institute of Technology (Caltech).

B3 Earthquake Supersite Point-of Contact (PoC)

Name: T. Wang

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B4: Event Supersite Research Team

The following research groups have expressed interest in the SAR data of the earthquake:

China

- Prof. Sidao Ni, Director, State Key Laboratory of Geodesy and Earth's Dynamics Institute of Geodesy and Geophysics, Chinese Academy of Science.
- Prof. Xinjian Shan, Director, Institute of Geology, China Earthquake Administration.
- Guangcai Feng (Central South University)
- Mingsheng Liao (Wuhan University)
- Yong Zhang (Peking University)

Saudi Arabia

- Teng Wang (KAUST)

Unite States

- Donald V. Helmberger (Caltech)
- Zhong Lu, (Southern Methodist University)

UK

- Wanpeng Feng (Universiy of Glasgow)

B5: Event Supersite description and justification

The Mw 6.1 earthquake occurred on August 3rd 2014 near Ludian county in Yunnan province of China has taken away more than 600 lives despite of its relatively small magnitude. Such large lost/magnitude ratio event is rare in the list of instrumentally recorded earthquakes. A detailed finite rupture model will shed some new lights on understanding the severe damage it has generated and on earthquake source physics, as well as its tectonic implications. However, due to its limited size, the resolution of seismological data alone is not sufficient to resolve the rupture details. The usage of optical images is also seriously limited due to the clouds of this region. Given the shallow earthquake depth, the SAR observation should be able to provide some near field deformation measurements that can be used jointly with seismic data to better image the kinematic rupture process of the earthquake.

All the research groups are glad to share their results and models via the supersites website. The availabilities of optical images from Chinese remote-sensing satellites and in-situ data are being addressed.

B6: Current or future use of requested data

Post-event images are requested with respect to each archived pre-event images (for interferometry) near the epicenter area.

B7: Schedule

Data provision should initiate as soon as possible.

B8: Detailed geographic region of interest

B9: Data Requirements

We request pre- and post-event image pairs from all available satellites (Cosmo-Skymed, TerraSAR-X and Radarsat-2). We also request possible pre-operational images from Sentinel-1 and ALOS-2 satellites. The imagery will be used for deriving near-field coseismic displacement field. We will use SAR interferometry (if applicable) and offset tracking techniques to resolve the surface displacement. Therefore, we request only one post-event image for each corresponding pre-event image. We listed below the archived images for all the three satellites and flagged the archived post-event image with red color.

TerraSAR-X

Acquisition time	Mode	Polarization	Path Direction
2008-10-16	Stripmap	VV	descending
2008-11-03	Stripmap	VV	ascending
2009-01-24	Stripmap	VV	ascending
2012-03-30	ScanSAR	HH	ascending
2014-08-09	Stripmap	VV/VH	descending

Radarsat-2

Acquisition time	Mode	Polarization	Image ID
2011-07-18 11:09:08	Wide Multi-Look Fine 22	HH	144035
2012-01-02 11:09:21	Wide Multi-Look Fine 22	HH	173765
2012-11-23 11:00:52	Standard 1	HH	230570
2014-03-04 11:09:03	Extra Fine W2	HH	313320

2014-08-05 11:17:26	Wide Ultrafine 22	HH	340229
2014-08-06 23:08:47	Wide Ultrafine 2	HH	340498
2014-08-06 23:08:54	Wide Ultrafine 2	HH	340498

In summary, we request

TerraSAR-X, archived 5 scenes, future acquisitions, 4 scenes with respect to each pre-event image.

Radarsat-2, archived 7 scenes, future acquisitions, 4 scenes with respect to each pre-event image.

Cosmo-Skymed , no archived image, 2 future acquisitions (near the epicenter area) are requested for damage assessment and possible cross-sensor offset estimation.

B10: Comments.

1. This event Supersite will provide images for scientists who are interested in studying this destructive earthquake despite of its small magnitude. Some high-resolution optical images were also collected, however, the dense clouds of this region prevent the usage of them. The SAR data requested here are therefore essential to help the on-going rescue activity and the follow-up rebuilding project.

2. The research teams are well aware that coherence can be low in this highly vegetated mountainous area. The amount of pre-event data is also limited.

Therefore, we are also developing new offset tracking techniques to derive coseismic displacement from SAR images acquired from different imaging modes, and/or from different satellites.