The Advanced Rapid Imaging and Analysis (ARIA) Project's Response to the April 25, 2015 M7.8 Nepal Earthquake: Rapid Measurements and Models for Science and Situational Awareness

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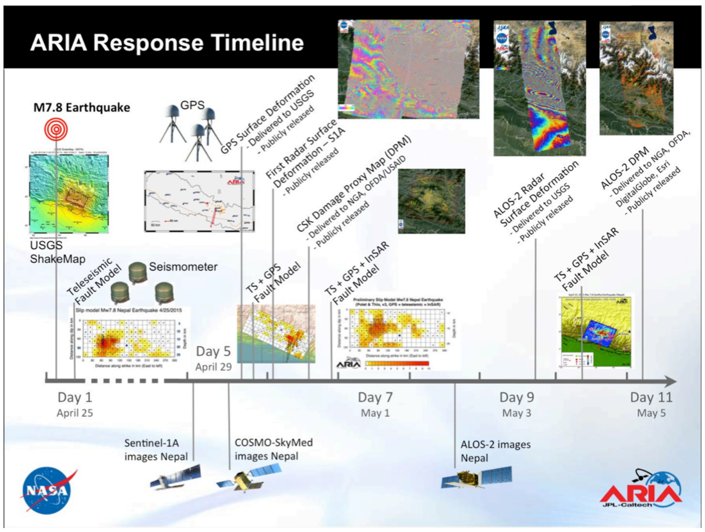

Figure 1. Timeline of ARIA response

On April 25, 2015, the M7.8 Gorkha earthquake struck Nepal and the city of Kathmandu. The quake caused a significant humanitarian crisis and killed more than 8,000 due to widespread building damage and triggered landslides throughout the region. This was the strongest earthquake to occur in the region since the 1934 Nepal-Bihar magnitude 8.0 quake caused more than 10,000 fatalities. In the days following the earthquake, the JPL/Caltech ARIA project produced coseismic GPS and SAR displacements, fault slip models, and damage assessments from SAR coherence change that were helpful in both understanding the event and in the response efforts (Figure 1). The ARIA project produced InSAR observations from two new SAR missions – JAXA's ALOS-2 and ESA's Sentinel 1a. The GPS coseismic displacements showed ~2 meters of southward motion and ~1.3 meters of uplift in Kathmandu. InSAR images of the displacement field (Figure 2) and fault models show that the rupture extended 135 km southeast of the epicenter. The SAR imagery also confirmed that the fault slip did not extend to the surface, though there was localized offsets formed due to liquefaction. The GPS and SAR analysis has continued to image the large M7.3 aftershock and postseismic deformation. The damage assessments from coherence change were used by several organizations guiding the response effort, including the NGA, the World Bank, and OFDA/USAID. We will present imaging, modeling, and damage assessment results from the recent April 25, 2015 M7.8 earthquake in Nepal, and its largest aftershock, a M7.3 event on May 12, 2015. We also discuss how these data were used for understanding the event, guiding the response, and for educational outreach.

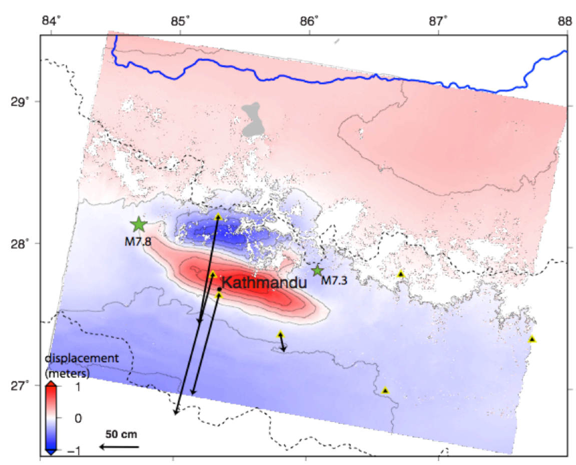

Figure 2. InSAR deformation (from JAXA ALOS-2 data) and GPS displacements (from Caltech sites)