# Exploiting Synthetic Aperture Radar data to map and observe landslides

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**Abstract**

Synthetic Aperture Radar instruments onboard satellites or airborne platforms are a powerful means to study landslides. How to best exploit the data and which techniques to apply strongly depend on the region of study and the landslide type which occurs. The amount of vegetation, snowfall, and steepness of the terrain, as well the shadowing effects of the mountain will determine if SAR is suitable to map a given landslide. Fast moving landslides occurring over a large area (e.g. $>$ 100 m) could benefit from pixel or feature tracking, while for slower moving landslides Interferometric SAR could be a more favorable approach. However, neither of those methods would work for critical landslide failures which do not preserve surface features. This type of slides would benefit from a change detection approach. Here we look at these three different cases and utilize Sentinel-1 space-borne SAR data and state-of-the-art processing techniques to map multiple landslides along the California State Route 1 and the Trishuli highway in the Langtang valley of Nepal. Our findings correlate with fieldwork observations and existing landslide catalogues, and also identify landslides in regions earlier mapped to be dormant. This work was supported in part by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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