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Tracking slow-moving landslides over large regions using open-access standardized InSAR products produced by the Advanced Rapid Imaging and Analysis (ARIA) Center for Natural Hazards project

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Slow-moving landslides are hydrologically driven and respond to changes in precipitation over daily to decadal timescales. Open-access satellite InSAR data products, which are becoming increasingly common, can be used to investigate landslides (and other ground surface deformation) over large regions. Here we use standardized open-access satellite radar interferometry data processed by the Advanced Rapid Imaging and Analysis (ARIA) team at NASA's Jet Propulsion Laboratory to identify 247 active landslides in California, USA. These landslides occur in both wet and dry climates and span more than ~2 m/yr in mean annual rainfall. We quantify the sensitivity of 38 landslides to changes in rainfall, including a drought and extreme rainfall that occurred in California between 2015 and 2020. Despite the large differences in climate, we found these landslides exhibited surprisingly similar behaviors and hydrologic sensitivity, which was characterized by faster (slower) than normal velocities during wetter (drier) than normal years. Our study documents the first application of open-access standardized InSAR products from ARIA to identify and monitor landslides across large regions. Due to the large volume of open-access InSAR data that is currently available, and will continue to increase with time, especially with the upcoming launch of the NASA-ISRO SAR (NISAR) satellite, standardized InSAR products will become one of the primary ways to deliver InSAR data to the broader scientific community. Thus, it is important to continue to explore new approaches to analyze these InSAR products for scientific research.