A close-up view of Bay Area natural hazards from outer space

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Satellite radar observations allow us to measure deformation of the Earth's surface at high precision and dense spatial resolution. We use these space-geodetic measurements to study a number of processes that represent natural hazards in the San Francisco Bay Area, including active tectonic faulting, landsliding and land subsidence. The observations capture details of fault slip along the Hayward fault and help define the likely rupture area of future large earthquakes on the fault. We can resolve the seasonal motion of active landslides in the East Bay Hills and on the Big Sur coastline and find a delayed acceleration following the onset of the rainy season. While sea levels are rising due to global climate change, land subsidence rates around San Francisco Bay exceed 10 mm/year in areas underlain by compacting artificial landfill and Holocene mud deposits. Maps of expected inundation hazards based on projections of sea level rise alone underestimate the area at risk of flooding compared with revised maps that account for the contribution of local land subsidence. High-resolution characterization of these active deformation processes using space-based observations is a first step toward improved hazard forecasting.

Biography: Roland Bürgmann received his Vordiplom in Geology at the Universität Tübingen, Germany, in 1987, his M.S. at the University of Colorado, Boulder, in 1989, and his Ph.D. at Stanford University in 1993. He is currently Professor at the Department of Earth and Planetary Science at UC Berkeley. His research interests are in active tectonics, crustal deformation and lithosphere rheology. His research group uses space-geodetic measurements, seismic data, and field observations to constrain crustal deformation associated with active faults, volcanoes, fluid reservoirs, and landslides. He is a Fellow and 2013 Birch lecturer of the American Geophysical Union and a Fellow of the American Association for the Advancement of Science (AAAS). He is currently chairing the National Earthquake Prediction Evaluation Council (NEPEC) and serves on NASA's Earth Science Advisory Committee. See http://seismo.berkeley.edu/~burgmann/ for more information about Bürgmann's research and publications.