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TITLE: Global climate change and local land subsidence exacerbate inundation risk to the San Francisco Bay Area

AUTHOR: ['Manoochehr Shirzaei', 'Roland Bürgmann']

ABSTRACT:

The current global projections of future sea level rise are the basis for developing inundation hazard maps. However, contributions from spatially variable coastal subsidence have generally not been considered in these projections. We use synthetic aperture radar interferometric measurements and global navigation satellite system data to show subsidence rates of less than 2 mm/year along most of the coastal areas along San Francisco Bay. However, rates exceed 10 mm/year in some areas underlain by compacting artificial landfill and Holocene mud deposits. The maps estimating 100-year inundation hazards solely based on the projection of sea level rise from various emission scenarios underestimate the area at risk of flooding by 3.7 to 90.9%, compared with revised maps that account for the contribution of local land subsidence. Given ongoing land subsidence, we project that an area of 125 to 429 km² will be vulnerable to inundation, as opposed to 51 to 413 km² considering sea level rise alone.

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