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Investigating Earthquake Hazards in South and Southeast Asia Using Satellite Observations

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Investigating earthquake hazards in South and Southeast Asia using satellite observations

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Large to moderate-sized earthquakes can occur throughout South and Southeast Asia, such as the 2004 magnitude 9.1 earthquake in Sumatra, Indonesia and the 2015 magnitude 7.8 earthquake in Nepal. Earthquakes in this region occur as a result of the collision between the Indian Plate, Eurasian Plate, and Sunda Plate. To the north, the collision between the Indian and Eurasian Plates gave rise to the Himalayas and represents a well-known seismic hazard, whereas the region to the east where the three tectonic plates collide beneath Bangladesh, northeastern India, and Myanmar is more complex and still largely understudied. Nevertheless, the resulting tectonic processes can produce devastating earthquakes to the communities in this region, which is home to more than 250 million people. The use of Interferometric Synthetic Aperture Radar (InSAR) satellites to measure the slow movement of Earth's crust allows us to study tectonic activity in the region, even through a densely vegetated and inaccessible forest. Here, we demonstrate the use of InSAR data, combined with Global Positioning Systems (GPS) observations, to examine how tectonic forces are distributed between the numerous faults in the region, each of which represents a significant earthquake hazard to major population centers throughout the region.