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Beneath Bangladesh, a Tectonic Time Bomb

By
David J. Craig
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The earthquake will come. No one can say when. But scientists warn that it could be huge. And in Bangladesh, a country so densely populated and ill-prepared, the death toll could be unprecedented.

The scientists, led by Columbia geophysicist Michael Steckler ’81GSAS, have been monitoring the ground in Bangladesh for more than a decade. Their work began in 2003, when they set up several GPS instruments around the country. By analyzing tiny changes in the distances between these fixed instruments and others installed in neighboring countries, Steckler and his colleagues have determined that the ground upon which Bangladesh rests is moving northeastward at a rate of about two inches per year, ramming into another section of the earth’s crust beneath Myanmar. This is causing a buildup of pressure, and if that pressure is released all at once, the scientists warn, it will cause an earthquake of incredible intensity.

“It’s hard to say exactly how bad it could be, because we don’t know how long the tension has been building,” says Steckler, a research professor at Columbia’s Lamont-Doherty Earth Observatory. “But we know there hasn’t been a significant earthquake in Bangladesh for at least four hundred years, which is as far back as historical records go in this area. So it’s been building up for at least that long.”



Brian Stauffer / Theispot.com

In a recent issue of *Nature Geoscience*, Steckler and his colleagues predict that if the tectonic plates that are colliding beneath Bangladesh were to dislodge and slip past each other in one momentous disturbance, the resulting earthquake would likely

register between 8.2 and 9.0 on the Richter scale. If the earthquake were on the higher end of this range, it would be among the largest ever measured.

Steckler and his coauthors are not predicting that an event of such magnitude is imminent in Bangladesh; they say it could be hundreds of years before a large earthquake occurs. Nor can they predict what point along the approximately 150-mile tectonic boundary is likely to be the epicenter. But the potential for calamity is immense, they say, as the fault appears to extend beneath an area that is home to some 140 million people. The danger zone includes the country's fast-growing capital of Dhaka, where no building codes existed before 1993 and where shoddy new construction projects continue to flout regulations. To make matters worse, some of the ground surface in and around Dhaka is unstable, consisting of several centuries' worth of soil deposited by the Ganges and Brahmaputra Rivers. During an earthquake, Steckler warns, the loose sediment could exacerbate the shaking.

"Dhaka is basically a city built on a bowl of Jell-O," he says.

In hopes of mitigating that danger, Steckler and his colleagues, who include Lamont-Doherty's Leonardo Seeber '64SEAS, Jonathan Gale '14GSAS, and Michael Howe '16GSAS, as well as researchers from Singapore's Nanyang Technological University and the City University of New York, are working with Bangladeshi colleagues to educate policymakers and members of the public about the need for more stringent enforcement of building codes and other preparedness measures.

"If the big one comes, there's going to be massive death and destruction," says Steckler. "But if buildings are designed to withstand earthquakes and emergency-response plans are developed for this type of disaster, many lives could be saved."

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