

Science Behind the Killer Earthquake: Why South Asia Must Be Prepared

by Ramtanu Maitra

A devastating earthquake on Oct. 8 flattened most of the western part of the disputed state of Jammu and Kashmir, belonging to Pakistan. The earthquake, which registered 7.6 on the Richter scale, struck during the morning when children were in schools. Thousands of children were killed, wiping out almost the entire next generation in this area. As of now,

officially, the death toll is above 30,000, but due to landslides and roadblocks, many remote villages remain out of reach and incommunicado. It is a certainty that the death toll will turn out to be much higher.

The hard, rocky terrain of Kashmir and northern Pakistan, where the land rises suddenly, will not give up its dead as easily as the sea did following the tsunami that took thousands of lives in south and southeast Asia last December. Inaccessibility, aggravated by the destruction of roads and bridges, lack of resources, and the onset of wet weather, is seriously hampering rescue and relief efforts.

Report From the UN: Earthquake Toll Mounting

Since South Asia was struck by a major earthquake Oct. 8, this disaster area—mainly Pakistan—continues to be the first item at the daily noon briefing at the U.N., and for good reasons. The massive destruction of major towns and entire villages (UNICEF estimates that 140,000 schools have been destroyed), the very difficult mountainous terrain, the approaching winter weather, and the enormous damage to roads, water, and sanitation make this the most difficult disaster to respond to in recent memory, according to a report from the World Health Organization (WHO).

As of Oct. 19, the death toll stood at 40,000, with at least 65,000 injured. Thousands of people in urgent need of medical attention have still not been attended to, and many injured may die or develop disabilities unnecessarily, because of lack of timely treatment. Reports of gangrene and hypothermia continue to grow, and an estimated 50-60% of the population in need have not yet received any food rations. About 350,000 “winterized” tents are required.

Although there are no reports of outbreaks of epidemics as of Oct. 19, the lack of clean drinking water and sanitation facilities is creating major health threats such as diarrhea, typhoid, and other waterborne diseases. In response to this, the WHO has in the last days sent out an appeal for urgent action to provide safe drinking water for the area. —*Leni Rubinstein*

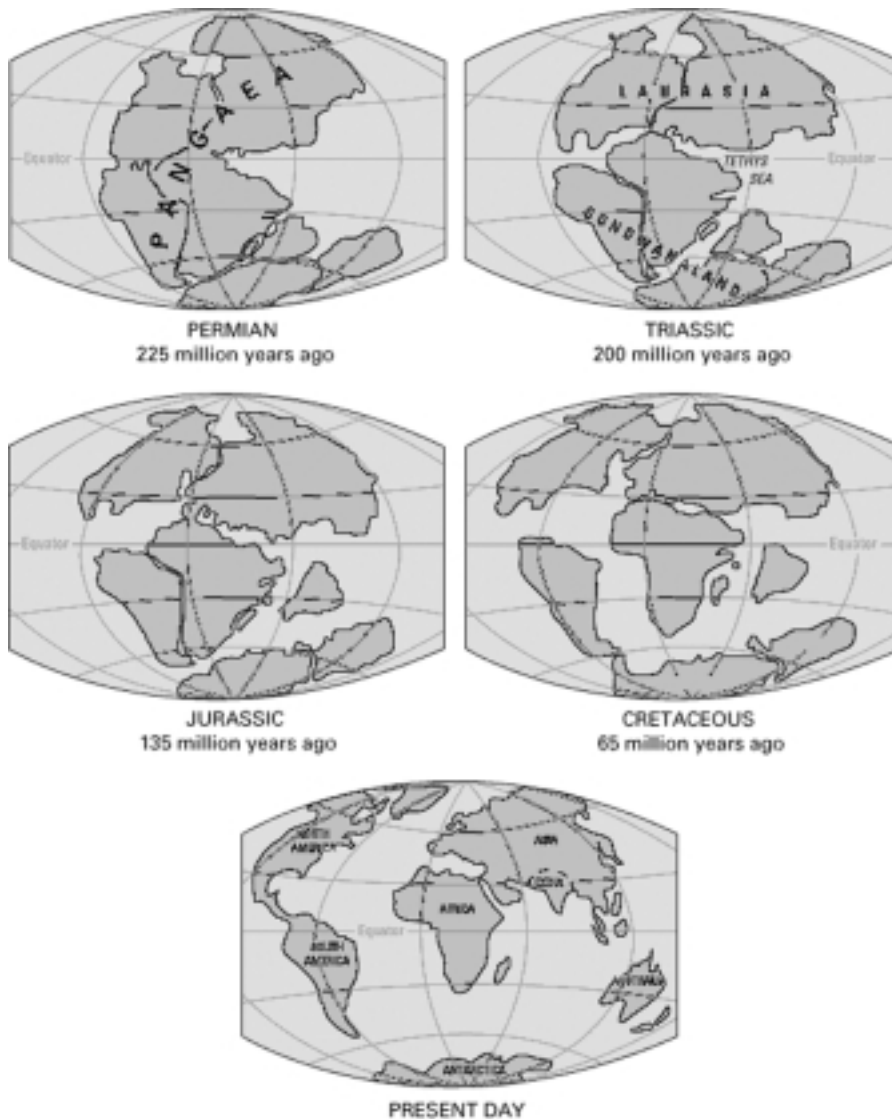
Vulnerable South Asia

South Asia is one of the most earthquake-prone regions in the world. Due to a state of unpreparedness, earthquakes in the region have resulted in a colossal loss of life and property over the decades. A cataclysmic earthquake in India's northeastern state of Assam in 1897, registering 8.1 on the Richter scale, killed several thousand people and caused part of the overlying Shillong Plateau to rise up nearly 50 feet in just three seconds. On April 4, 1905, a powerful earthquake destroyed the district of Kangra in northwest India's state of Himachal Pradesh, killing almost 20,000 people. A massive earthquake again struck the northeastern region of India along the Indo-China border in 1950. One of the strongest in the 20th Century, it measured 8.6 on the Richter scale but left little damage in the sparsely populated area.

The Genesis

About 225 million years ago, India was a large island still situated off the Australian coast, and a vast ocean (called the Tethys Sea) separated India from the Asian continent. When the supercontinent Pangaea broke apart about 200 million years ago, India began to forge northward. By studying the closing of the Tethys Sea, scientists have reconstructed India's northward journey. About 80 million years ago, India was located roughly 6,400 km (4,000 miles) south of the Asian continent, moving northward at a rate of about 30 feet a century. When India rammed into Asia about 40 to 50 million years ago, its northward advance slowed by about half. The collision and associated decrease in the rate of plate move-

Movement of the Earth's Continents



Source: <http://pubs.usgs.gov>.

According to the theory of plate tectonics, the Earth's outermost layer (once forming a single continent), became fragmented into a dozen or more large and small plates that are moving, relative to one another, as they ride atop hotter material beneath the Earth's crust. Stresses build up which are relieved periodically by earthquakes, such as that which devastated Pakistan this month.

ment are interpreted to mark the beginning of the rapid uplift of the Himalayas.

The movement of the Indian subcontinent continues to put enormous pressure on the Asian continent, and Tibet in turn presses on the landmass to the north that is hemming it in. The net effect of plate-tectonics forces acting on this geologically complicated region, is to squeeze parts of Asia

eastward toward the Pacific Ocean. One serious consequence of these processes is a deadly "domino" effect: Tremendous stresses build up within the Earth's crust, which are relieved periodically by earthquakes along the numerous faults that scar the landscape. Some of the world's most destructive earthquakes in history are related to continuing tectonic processes that began some 50 million years ago.

Massive Energy Build-Up

Earthquakes happen when energy stored up along geological faults, like the Himalayan thrust, is suddenly released. The magnitude of the Oct. 8 earthquake is the largest since 1950. Scientists point out, that as more time passes without seismic release, more energy accumulates, making a giant earthquake more likely.

What intrigues some scientists is that earthquakes rattled the Philippines and Indonesia almost at the same time that it had hit Kashmir. The three quakes have three different epicenters, and none of them has a harmonic tremor signifying any volcanic activities. According to some scientists, the earthquakes are caused by plate bending and stress factors on the global tectonic plates. In other words, though these earthquakes have different epicenters and are thousands of miles apart, they are all connected. In fact, the continuous strand of earthquakes from Indonesia has directly moved towards the Himalayan area, which is very dynamic in terms of earthquake activity. Hence, in case of tectonic activities generated along the boundary, it would invariably travel to the Himalayan zone.

While there is no way to predict an earthquake beforehand, there are ways to avoid huge loss of lives. Many informed observers close to the shattered ground in the state of Jammu and Kashmir believe that at least half of the deaths can be attributed to the collapse of houses constructed of inappropriate materials and in violation of planning rules and regulations—where they exist at all.