

EARTHQUAKE RISK IN BANGLADESH

PASSAGE THREE

Results

Shillong Plateau and Fault System

Scientists are very interested in the Dauki fault system around the Shillong Plateau. They've made some important findings:

Many small faults are found along the Dauki fault. But the data shows a **single, major fault** under the Shillong Plateau. Scientists think this long, hidden fault presents the greatest earthquake hazard. While lots of smaller faults can cause frequent earthquakes, a large fault like this one can produce huge earthquakes that just don't happen as often.

The data has also revealed that the fault is **closer to Dhaka** than once thought. The team found that the dips, or angles of the rock layers, increased the farther south they measured. "If the fault is 10 to 20 km to the south, that means the source of the earthquakes is closer to the capital city of Dhaka," explains Humayun Akhter.

Finally, the team has found that the Dauki fault is **highly active**. Seismic stations in the region have detected more than 100 seismic events per year — including many too small for humans to feel — near the Dauki fault. There is also evidence from GPS that the fault is active. Based on GPS data, the Shillong Plateau is moving to the south about eight millimeters per year. At the same time, the Burmese plate to the east is pushing west. In both places, rocks fold and buckle under the strain. And this strain is building up towards an enormous earthquake.

Putting the Data Together

Data from field observations, seismic stations, and GPS show that the area is prone to earthquakes. But it also shows the potential for a



The aftermath of the 1897 Assam Earthquake. Image courtesy of Roger Bilham, University of Colorado Boulder.

HISTORY OF MAJOR EARTHQUAKES IN THE REGION



NORTHERN INDIA:

Three "mega-quakes" occurred along the northern boundary of the Indian plate (in 1125, 1400, and 1505). In each of these earthquakes, the Himalayan Mountains pushed several meters over the India Plate.



SOUTHERN BANGLADESH / MYANMAR:

A huge earthquake and tsunami occurred in 1762 along the Burma Arc plate boundary. This earthquake changed the landscape and uplifted many islands.

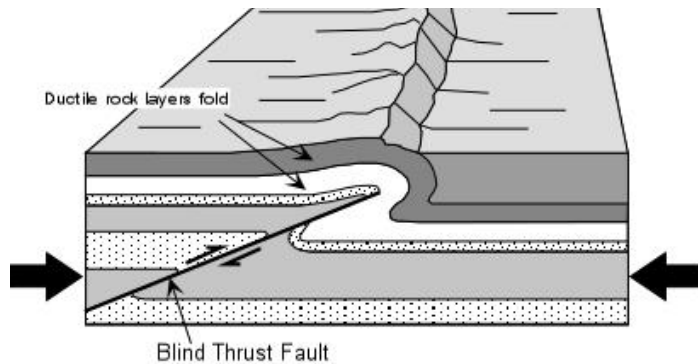


NORTHEAST INDIA:

In 1897, a massive earthquake occurred at a fault along the Shillong Plateau. The force pushed up the northern edge of the plateau several meters. About 125 miles (200 km) away, many buildings in Dhaka were destroyed.

CONTINUED

Results



ANTICLINE

How a blind thrust fault can form an anticline. The large arrows indicate the direction that force is being applied. Image courtesy of Stephen Nelson, Tulane University

very large earthquake or “megaquake.” “The bigger the fault, the larger the earthquake it can generate,” says Seeber. “The Dauki Fault is a huge structure. So we expect a very large earthquake.” This prediction is also supported by the region’s history: major earthquakes have occurred in the past, especially where the two major tectonic plates collide along the Himalayas. Today, scientists think that megaquakes along the Himalayas are not just possible but inevitable.

Scientists can also use the data to estimate the time between earthquakes. Along the Dauki fault, the rocks are moving very slowly, which typically means a long time passes between large earthquakes. Unfortunately, this has also made it easy for people in Bangladesh to just not think about earthquakes. “You may say, ‘Oh, we never had an earthquake, why should we worry?’” says Seeber. “Geology tells you no, there is a fault, it is active, and the reason you haven’t seen a major earthquake during recent history is simply that the repeat times are very long.”

STOP AND THINK

BASED ON THE TEXT:

1. What did the scientists observe about the tectonic activity in this region?
2. What did the scientists infer from their findings?
3. Which science practices were used by the scientists?

LOOKING AHEAD:

4. Scientists are also investigating the interaction between tectonics and the delta formed by the Brahmaputra, Ganges and Meghna Rivers. How might a major earthquake affect this river system?