

Scientists puzzled by absence of foreshocks and other typical precursors prior to China Earthquake

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Scientists puzzled by foreshock-less SW China earthquake

BEIJING, May 20 (Xinhua) — Some scientists were puzzled by the unusual quiet period of quakes before the 8.0-magnitude earthquake struck southwest China. But others believe there had been precursors, which stood as warnings for a major quake.

“There were no foreshocks and the activity level of minor quakes around the epicenter was low for quite a long time before the earthquake,” said Xiu Jigang, deputy director of the China Seismological Bureau (CSB).

He said there were no short-term anomaly of animals, underground water and other typical precursors, which can lead to a prediction of a major earthquake.

Chinese netizens cited tens of thousands of migrating toads before May 12 in Mianyang, a city close to the epicenter of the earthquake in southwestern Sichuan Province, and unusual cloud formations in east China’s Shandong Province as quake precursors. But experts said they might not be related to the quake.

“There are complicated reasons for the anomaly of animals and underground water. An earthquake is only one of them along with climate change and weather conditions,” said Zhang Guomin, a research fellow with the Research Institute of Seismology under CSB.

Another expert with CSB, He Yongnian, said cloud formation was put forward by Japanese scientists as a way of forecasting earthquakes. But like many other methods of prediction, it is not mature enough.

Besides all those, a Taiwan satellite recorded a sharp drop in ionospheric density above Sichuan before the Wenchuan earthquake, according to a Taiwan newspaper.

The newspaper said that the province’s Formosa-3 satellite recorded ionospheric density in the atmosphere of 1.2 million electrically charged particles in some 1,000 square kilometers around Wenchuan six to 15 days before the May 12 earthquake. On May 11, the eve of the quake, ionospheric density had dropped by half to 600,000 charged particles, it said.

“There is absolutely no doubt that there were electronic precursors,” said Gary Gilson of the Seismology Research Center at Monash University in Melbourne, Australia.

But he said the satellite recording of ionospheric changes may not be practical to use in earthquake forecasting and it would be difficult to do it quickly.

China’s earthquake prediction program, which was born with the founding of CSB in 1971, has proved successful at least for two major earthquakes. The bureau made its first successful short-term prediction 13 hours before a 7.3-magnitude quake hit Haicheng in northeast China’s Liaoning Province on February 4, 1975. There were frequent foreshocks as well as other anomalies, which clearly pointed to a strong earthquake, the CSB said.

Then in 1995, scientists used various precursors including foreshocks and variation in water levels and temperature to warn local authorities one day before a major earthquake struck Menglian County in southwestern Yunnan Province.

However, the precursors were still elusive, with the lack of a short-term prediction before the 7.8-magnitude Tangshan earthquake in 1976. So the successful prediction was limited to a small percentage of quakes mainly with frequent foreshocks, said He Yongnian.

“The methods Chinese scientists use for earthquake prediction are mainly empirical,” said Gibson, “but they are still useful.”

Some Chinese experts said that the long-term and medium-term quake prediction is much more successful in China than short-term prediction.

Deputy director of the Institute of Geology of CSB Xu Xiwei said short-term prediction means a warning of “time, place and magnitude of an earthquake” shortly before it takes place, which is a very complicated issue.

“Earthquake forecasting remains a puzzle for the world,” said deputy director of China Earthquake Networks Center Zhang Xiaodong.

However, research fellow with the Institute of Crustal Dynamics of CSB Qiu Zehua said, China would be able to make substantial progress in short-term prediction if more monitoring stations could be set up in areas which have been found prone to earthquakes.

“I believe that there must be precursors before an earthquake, but they might only happen in areas around the epicenter,” said Qiu. “The problem is that our monitoring stations are too scattered to observe them. We should focus our monitoring efforts in certain targeted areas.”

Researchers in China, a country which suffered 33 percent of the world's inland earthquakes in the 20th century, are catching up with international seismological studies. In the measurement of the earthquake in Sichuan, the first report by CSB set the magnitude at 7.6 on the Richter scale after the quake on May 12. The quake was shortly upgraded to 7.8, based on more statistics from monitoring stations. Then the bureau revised the magnitude to 8.0 on Sunday, with reference to foreign observatories.

The magnitude was revised upward after specialists carried out "real-time and detailed measurements of the quake according to international practices," said Luo Zhuoli, an expert with CSB.

The quake, claiming 34,073 lives as of 4:30 p.m. Monday and leaving 245,108 injured so far, has caused serious damage to buildings, bridges and other public facilities in an area of more than 100,000 square kilometers.

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