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Seismic Japan/When the Earth Roars

Both by Gregory Smits, £46.50/£49.95, ISBN 978 0 8248 3817
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The Great East Japan earthquake and tsunami of March 2011, of magnitude 9.0, killed almost 20,000 people and destroyed the Fukushima Daiichi nuclear power plant. It provoked many claims – not least from the Tokyo Electric Power Company – that since the event was unprecedented nothing could have been done to prepare for such a disaster. Japan's acting finance minister called it "an act of God". But the historical record of earthquakes and tsunamis in coastal north-east Japan contradicts these claims.

Highly destructive tsunamis hit the Sanriku coast as recently as 1896 and 1933. Tepco executives certainly knew the risks of another event, but repeatedly ignored warnings. The result, as the Prime Minister stated just after the disaster, was Japan's worst crisis since the end of the Second World War.

Gregory Smits, a US-based expert on the modern history of Japan with a special interest in earthquakes, has written two deeply researched and easily readable studies. Both deal with Japanese seismic history, and inevitably there is some overlap. However, 'Seismic Japan: The Long History and Continuing Legacy of the Ansei Edo Earthquake' focuses on the Ansei Edo earthquake of 1855 centred on Tokyo (formerly Edo), which was a significant factor in the end of the shogunate and the opening up of Japan to foreign influence from the 1860s.

'When the Earth Roars: Lessons from the History of Earthquakes in Japan' gives most attention to the north-east, and contains more science than 'Seismic Japan', including a highly critical history of Japanese attempts at earthquake prediction since the 19th century. Engineers will find the second book relevant; but anyone with a serious interest in Japanese earthquakes should read both.

Two examples cited by Smits bring home the challenges for seismologists. In 1905, Akitsune Imamura predicted Tokyo would suffer a great earthquake during the next half-century and, since most of the city was built of wood, fires would cause more than 100,000 casualties. He argued that Tokyo should switch from petroleum lanterns to electric lighting.

But another seismologist, Fusakichi Omori, denounced the basis of Imamura's prediction and pronounced Tokyo safe. When the 1923 Great Kanto earthquake hit and two-thirds of Tokyo burned, Imamura was apparently vindicated, Omori discredited. Yet this is too simple a conclusion. A comparable prediction in 1977 by seismologist Katsuhiko Ishibashi of an imminent earthquake – the so-called Tokai earthquake in the manufacturing region south-west of Tokyo – caused great alarm and the channelling of massive financial resources into a government programme of earthquake monitoring and prediction. Ishibashi also warned of seismic dangers to nuclear power plants. A great Tokai earthquake subsequently failed to occur; but the warning about nuclear power proved prescient in 2011.

In other words, reliable prediction of great earthquakes is impossible – but preparation against them may be possible. This lesson was reinforced by the totally unpredicted Kobe earthquake in 1995, after which many buildings were fitted with base isolation. “The dramatic and effective swaying of tall buildings in Tokyo and elsewhere during March 2011 was in part a result,” notes Smits, “of lessons learned or confirmed in 1995.”

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