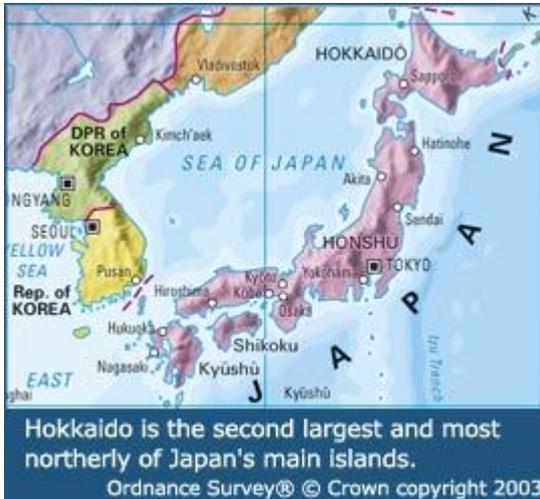


Big in Japan 02 Oct 2003



Japan hits this year's earthquake jackpot with a massive, magnitude 8.3, quake. The world's largest in 2½ years! The earthquake caused continuing after shocks throughout the last days of September 2003.

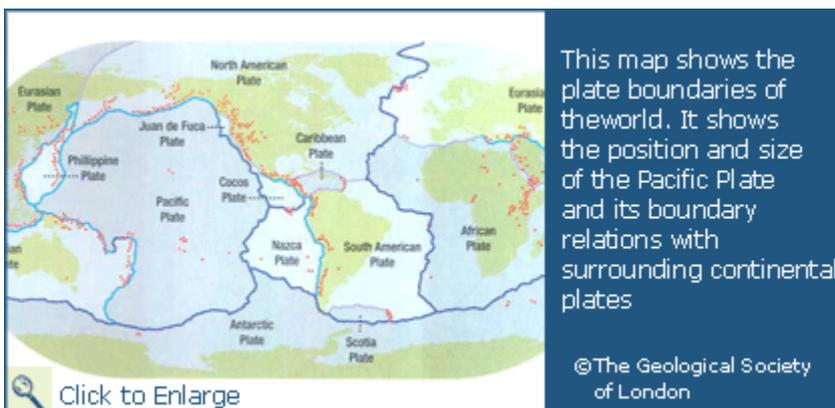
No sooner had New Zealand been hit by a large seismic event that caused continuing after shocks throughout September 2003, than Japan's northern island of Hokkaido was hit.

To find out more about New Zealand's quake look at [The Two Tremors: should we be surprised by seismic shifts in Middle Earth?](#)

Unlike the New Zealand event Japan's northern island, called Hokkaido and where the quake occurred, is more populated. However, compared with the other main islands of Japan, in particular Honshu, where the major cities of Tokyo, Osaka and Kobe are located, Hokkaido has a **relatively low population density**. Hokkaido, about 83,500 square kilometres in area, constitutes more than 20 percent of Japan's land area. With about 90 percent of Japan's pastureland, it produces the same proportion of its dairy products and manufacturing industry has played a smaller role compared with the other regions.

Why did the earthquake happen and what were the main effects?

The map shows the position and size of the Pacific plate. It is almost entirely composed of oceanic crust and has boundary relations with the surrounding continental plates such as the North American plate.



What is not easy to see is what is happening where different sections of the plates meet each other. With the New Zealand quake it was clear that the plate boundary in the South Island was one in which the plates were sliding past each other. This is called a transform fault boundary. However, in Japan, the boundary is very different.

How are earthquakes created at the plate boundary in Japan?

East of the Japanese islands the Pacific plate is moving west north-west at about 8.2cm a year. Most of the earthquakes are caused by the Pacific plate being dragged down below the Eurasian plate creating a deep ocean trench off the coast leading to a **subduction zone**. This is a sort of conveyor belt carrying

material deep into the earth's crust. The oceanic crust, as it is thrust below the continental plate, causes friction between the two colliding plates thus creating earthquakes at what is termed a convergent plate boundary. However, although an earlier quake in 1993 seems to have been caused in this way the present event seems, from first investigations, due to the oceanic plate breaking or faulting at the junction of the overthrusting North American plate, which, as you can see from the map, extends across the Bering Straits into Asia.

What were the main effects of the earthquake?

Fortunately the current earthquake occurred about 140 km off the coast at a depth of 27 km. Had it been below the nearby coastal populated area it might have been more devastating. Nevertheless, a tsunami warning was issued for the whole eastern coast of Russia and Japan. Waves a metre high were recorded and 40,000 people briefly evacuated their homes but massive coastal disruption did not occur.

Further inland, considerable damage occurred. Perhaps because the first shock came whilst people were asleep in the early hours there was only one death and about 400 people injured. These figures were comparable to a previous 1993 event although in that case it was slightly lower magnitude (7.6).

So what did happen? Roads buckled, some 370,000 homes lost electricity, the roof of Kushiro airport control tower caved in, fire broke out in the Tomakomai oil depot, a train derailed and many roads were blocked by **landslides**. Inevitably, buildings swayed and a few collapsed but here, as in the rest of Japan, **building to survive earthquakes** is taken very seriously. However, within hours as the Washington Post reported 'residents of Japan's northern island of Hokkaido were counting themselves lucky and resuming life as usual'. They commented that one resident said, 'We've had earthquakes here for as long as I can remember you're better off not trying to run around' (www.washingtonpost.com 27 September 2003).

Activity (linked to 'Colliding Plates Case Study') : *Explore the case study of Wellington, New Zealand, another place awaiting the 'Big One' and compare what really happened in Hokkaido, Japan with what could occur in Wellington.*