

# Geological evidence for past earthquakes in Tokyo region

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In 1923, a magnitude 7.9 earthquake devastated the Tokyo area, resulting in more than 100,000 deaths. About 200 years earlier, in 1703, a magnitude 8.2 earthquake struck the same region, causing more than 10,000 deaths.

These earthquakes, which occurred just south of the area hit by the March 2011 [Tohoku earthquake](#), were produced by slips on the boundary between the subducting Philippine Sea plate and the overlying plate.

To estimate the average recurrence time between earthquakes in this region, and thus learn more about [earthquake hazard](#), scientists need to know when earthquakes occurred before 1703. There are few historical documents describing earlier earthquakes, though some records indicate that earthquakes occurred in 1293 and 1433.

To learn more about past earthquakes, Shimazaki et al. analyzed cores about 2 meters (6.6 feet) long from eight tidal flat sites on the Miura Peninsula in Japan. Their cores contained layers of shell-filled gravel that the researchers infer were deposited by tsunamis associated with the 1703 and 1923 earthquakes, as well as a third layer of tsunami-deposited material. The authors used [radiocarbon](#) dating to date the third event to sometime between 1060 C.E. and 1400 C.E. That is consistent with a large earthquake having occurred in 1293. If so, that indicates that the recurrence interval of these earthquakes varies from about 200 to about 400 years. The study could help scientists assess the earthquake and

tsunami hazard in the Tokyo area.

**More information:** Geological Evidence of Recurrent Great Kanto Earthquakes at the Miura Peninsula, Japan, K. Shimazaki and H. Y. Kim, *Journal of Geophysical Research-Solid Earth*, [doi:10.1029/2011JB008639](https://doi.org/10.1029/2011JB008639) , 2011

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