

## What controls the maximum magnitude?

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The Wenchuan earthquake has large magnitude as Mw7.9 and our historical data could not predict such large event in Sichuan province. Generally, we predict the size of the earthquake which will occur in future using the historical data. But, our data was not compiled all event in the past. So, we must estimate the maximum size of the future earthquake in other way. Kudo et al.(2009) proposed the geothermal gradient control the maximum magnitude for inland earthquakes in Japanese island. The elastic thickness of the plate may affect the size of maximum magnitude of earthquakes, but we think the other factor will control it.

Mega quakes of which magnitude were over 9 occurred along the subduction plate boundaries, like 1700 Cascadia M9, 1952 Kamchatka Mw9.0, 1957 Aluetian Mw9.0, 1960 Chile Mw9.5, 1964 Alaska Mw9.2 and 2004 Sumatra Mw9.1. So, the interplate earthquake could exceed Mw9. On the contrary, the Wenchuan earthquake was the large intraplate earthquake occurred in the continental crust. In Japan, the biggest intraplate earthquake was the Nobi 1891 M8.0 earthquake, but the recent Japanese researches revised magnitude. That Mw was around 7.5. In China, 1920 Haiyuan earthquake was M8.5 and 1927 Gansi earthquake was M8. These earthquakes had not Mw, but 2001 Kunlun earthquake was M8.1 and Mw7.8. These magnitude of Chinese earthquakes were clearly larger than the one of Japanese. The cause of this difference owes to the difference of the thickness of the crust. The thick crust can generate large earthquakes.

The other way to estimate the maximum magnitude of earthquakes is the fault type in that region. We can divide the mainland China to the normal fault areas and the reverse fault areas using CMT solutions by the Global CMT Project. The maximum magnitude in the reverse fault was Mw7.9 Wenchuan earthquake. On the contrary, the maximum magnitude in the normal fault area was around Mw7 and it was clearly small.

So, the ways to estimate the maximum magnitude for future earthquakes are proposed. The one is to evaluate the crustal thickness and the other is to know the fault type in the target region.

Keywords: magnitude, fault type, crust