Thickness of the seismogenic layer beneath the Japanese Islands and its relation to crustal earthquakes

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The thickness of the seismogenic layer is one of the fundamental parameters for earthquake hazard analysis. Large earthquakes often rupture the entire brittle seismogenic layer, and so the thickness of the seismogenic layer is a primary control on the size of earthquakes. Omuralieva et al. (2012) estimated the cut-off depth (D90) of crustal seismicity beneath Japan using a high-quality seismic catalogue of the Japan Meteorological Agency. D90 is defined as the depth above which 90% of the earthquakes occur. The obtained D90 shows a considerable lateral variation, ranging from ~5 km to ~40 km. The D90 is deep along the Pacific coast of eastern Japan, while it is locally shallow around volcanic areas. These lateral variations in D90 are inversely correlated to values of surface heat flow. In this talk, I summarize the recent result of D90 in Japan and discuss the relation among D90, thermal structure, and the size of crustal earthquakes.

Keywords: Earthquake, seismogenic layer

