

Depth of seismogenic layer in the Japanese Islands

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JMA revised the hypocenter determination method in October 2001 by adopting a new travel-time table called 'JMA2001' and a new weighting function. Accuracy of hypocenters was greatly improved by the revision. We investigated spatial distribution of the depth of seismogenic layer in the Japanese islands by using the new JMA catalogue for earthquakes since October 1997.

After selecting crust earthquakes we calculated depths that cumulative number of earthquakes counted from the top side amounts 10%, 50% and 90%, respectively. Then, we made maps representing the spatial distribution of those depths.

Followings are characteristics of the depth distribution.

1. Depth of the seismogenic layer is generally deeper on the side of the Pacific Ocean than on the side of the Sea of Japan.
2. The seismogenic layer is shallow along a line from the Shakotan Peninsula down through the Oshima Peninsula, a central mountain ridge in the Tohoku District, western part of Fukushima Prefecture, then Nagano and Toyama Border, north of Biwa Lake to eastern part of Shimane Prefecture.
3. The seismogenic layer is shallow along the Median Tectonic Line from the Kii Peninsula to Shikoku, and its extension to the west, along the Beppu-Shimabara Graben.
4. Except the Izu Peninsula, northern part of Kyoto Prefecture and western part of Kyusyu, depths of earthquakes in coastal regions are relatively deep compared to those of inland.
5. Along the north-south zone from Teshio Mountain area to the Sanriku coast, the depth of seismogenic layer is somewhat deep.
6. It is seen that in the Niigata plain and around the Seto Inland Sea, especially in and near Hiroshima Prefecture, the depth of seismogenic layer is deep.
7. In such a region where a large earthquake occurred recently, it is observed that earthquakes are distributed to shallower part of the crust than the surrounding region.