

# Aftershock activities of slab earthquakes in the Japanese Islands based on the JMA's hypocenter database (1983 Jan.-1997 Sep.)

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**INTRODUCTION** We investigated aftershock activities accompanying slab earthquakes in and around the Japanese islands during the period from January 1983 through September 1997 by using the hypocenter database prepared by the Japan Meteorological Agency (JMA). This study is a continuation of Horii and Ishibashi (2004), which studied the same subject based on the JMA's integrated hypocenter database for the period from October 1997 through June 2003, in order to get more informations.

**MAINSHOCK SELECTION** We picked up 16 slab earthquakes for analysis. Eight of them took place in the Pacific slab, and others, in the Philippine Sea slab. We focused on earthquakes of M 5.5 or larger and selected slab earthquakes mainly from three regions in Japan, region A (lat.42-47, long.138-146, depth 60-120 km) around Hokkaido, region B (lat.34-42, long.138-143, depth 60-100 km) around the Kanto-Tohoku districts and region C (lat.30-38, long.128-138, depth 30-100 km) in southwest Japan. We eliminated the earthquakes which took place far offshore from the seismological network. We included the 1987 Chiba-ken-toho-oki earthquake (M6.7, depth 58 km) in the region B though it was a little shallower.

**METHOD** The method of analysis is the same that used in Horii and Ishibashi (2004). For each earthquake, we set an 'aftershock region' based on 3-dimensional and spatio-temporal distributions of earthquakes around the main shock, and regard events within this region during the 30-day period since the main shock as aftershocks. We eliminate obviously triggered activity around the main shock. For ten main shocks, it turned out that almost all aftershocks of M 3 or larger have been detected by examination of the magnitude-frequency relationship, but for other six earthquakes we could not estimate the detectable magnitude level.

**RESULTS** Six main shocks were accompanied by ten or more aftershocks of M 3 or larger during the 30 days since the main shocks as follows; 1993 Kushiro-oki (depth 101km, M7.5, number of aftershocks 48), 1984 Hyuga-nada (33km, M7.1, 93), 1987 Chiba-ken-toho-oki (58km, M6.7, 64), 1987 Iwate (72km, M6.6, 21), 1987 Hyuga-nada (48km, M6.6, 18), 1985 Ibaraki-Chiba (78km, M6.0, 13). Although the magnitude of the 1993 Kushiro-oki earthquake was the largest among the studied slab earthquakes, the number of aftershocks was smaller than those of the 1987 Chiba-ken-toho-oki and the 1984 Hyuga-nada earthquakes, and the magnitude difference between the main shock and the largest aftershock was 2.3, the largest among all earthquakes of M 6 or larger. Aftershock activities accompanying slab earthquakes don't show any simple dependence on size or depth of main shocks. However, there seems to be some regional characteristics. For example, in the Kanto district, aftershock activities are relatively high. On the other hand, in the Kii Peninsula area, aftershock activities are considerably low. In the southwestern Hyuga-nada area, many aftershocks smaller than M 3 or 4 took place, though the overall aftershock activities were not necessarily very high.

**Acknowledgements:** We wish to thank the Japan Meteorological Agency, whose hypocenter database has been used in this study.