

1. AREA OF FLOODED LAND
 2. DISTRIBUTION OF LANDSLIDES
 3. DISTRIBUTION OF STEEP SLOPES
 4. MAJOR EARTHQUAKES AND TSUNAMIS
- DISTRIBUTION OF INTENSITY OF MAJOR EARTHQUAKES

1. Area of Flooded Land

The area of flooded land has shown a tendency to decrease in recent years. The annual average area of land flooded during the five years from 1963-1967 was about 200 thousand ha., while that for the period from 1983-1987 was approximately 60 thousand ha., one-third that of the former. Sixty thousand ha. corresponds to approximately 1.2% of the total lowland area of Japan.

Flood damage is mainly caused by heavy rain, localized torrential rain caused by typhoons, low atmospheric pressure and fronts; in addition it may also result from tsunamis which occur after earthquakes and high tides caused by typhoons. The recent decrease in the area of flooded land is due to the fact that no super-large typhoon approached Japan and also to technical developments in weather forecasting and the transmission thereof, and improvements in disaster prevention facilities.

However, although the total area of flooded land is decreasing, the total amount of damage per unit area of flooded land is not, due to the expansion of built-up areas on lowlands and an increase in inland water overflow.

[Salient Points of the Legend and Map Compilation]

The area of flooded land shown on the map is the total area of land flooded during the ten-year period from 1978-1987, classified by Si, Mati and Mura.

2. Distribution of Landslides

Landslide generally refers to the phenomenon whereby soil on a slope moves downwards; here, however, landslide is used in a narrow sense to mean the phenomenon whereby the upper layer of soil on a slope slowly slides, differing from collapse, a phenomenon of sudden soil movement.

Concerning the relationship between geology and landslides, in Japan landslides occur most frequently in areas where the Neogene System is located. The landslides seen to the Japan Sea side, such as Niigata and Isikawa Prefectures, occurred mostly on the Neogene System. Landslides also often occur on the fracture zone near the tectonic line in the Sikoku area. They also occur near hot springs as rocks are changed into clayey soil by hydrothermal activity.

Landslide activity has two characteristics: continuity and repetition.

Since landslides cause damage to forests, cultivated land, buildings, roads, etc., the Landslide Prevention Act designates those areas where landslides actually occurred and those where landslides are highly likely to occur as landslide control areas, and provides countermeasures.

[Salient Points of the Legend and Map Compilation]

Landslide control areas designated by the government: landslide areas designated by the Landslide Prevention Act and maintained by either the Ministry of Agriculture, Forestry and Fisheries; the Forestry Agency or the Ministry of Construction.

Areas other than the designated control areas with a danger of landslide: landslide areas investigated by these Ministries and found to be qualified for designation under the Landslide Prevention Act.

Landslide area refers to areas of 5 ha. or more for which landslide prevention has been undertaken. This map uses one dot to indicate one area (except densely distributed areas).

3. Distribution of Steep Slopes

Japan has many mountains, and hills with steep slopes throughout the country. In the rainy season and during typhoons Japan experiences the torrential rain which causes slope failures. Of the total number of people who are killed or go missing in natural disasters every year, 30-70% are the result of slope failures. If the soil of a slope is hit by localized torrential rain after it has been saturated by long periods of frontal rain, such as that occurring in the rainy season, or autumn rain, the slope collapses easily resulting in a debris flow.

Recently, due to the expansion of built-up areas, houses are built even in areas with a danger of slope failures, and the number of housing areas with steep slopes behind them is increasing. In order to ensure safety in these areas, the Act Concerning Prevention of Disasters Due to Steep Slope Failure was passed in 1969; areas with a danger of steep slope failure were designated to prevent dangerous activities, construction work carried out to prevent steep slope collapse and improvements made in the warning and evacuation system.

[Salient Points of the Legend and Map Compilation]

Every single designated area is indicated by a dot on this map (except densely distributed areas).

4. Major Earthquakes and Tsunamis

Japan and the surrounding area frequently experiences earthquakes. Approximately one thousand earthquakes which can be felt occur annually, with major earthquakes occurring several times.

In addition to causing direct damage to buildings, earthquakes may also cause liquefaction of soil, landslides, tsunamis, fires and damage to 'lifelines' such as electricity, gas and water supplies.

Tsunamis are often generated when a large earthquake occurs at the bottom of the sea. Tsunamis originating in the open sea around South America or off-shore from Alaska may cause damage upon reaching the coast of Japan. A rias coast, such as the Sanriku coast, is subject to largescale damage from tsunamis as they become especially high in the heart of the bay.

Eight special earthquake observation areas and two intensified observation areas in Tokai and Minami Kantō have been designated in order to promote the prediction of earthquakes through observation and research.

[Salient Points of the Legend and Map Compilation]

The epicenter, year of occurrence and magnitude of major earthquakes which happened prior to 1984 are according to Usami (1987), while those which occurred after 1984 are according to the *Rika Nenpyō (Chronological Scientific Tables)*.

Areas damaged by tsunamis are according to Watanabe (1985) and indicate tsunamis with a height of 1m and over (tsunamis caused by earthquakes occurring in Japan or foreign countries since 1926).

4. Distribution of Intensity of Major Earthquakes

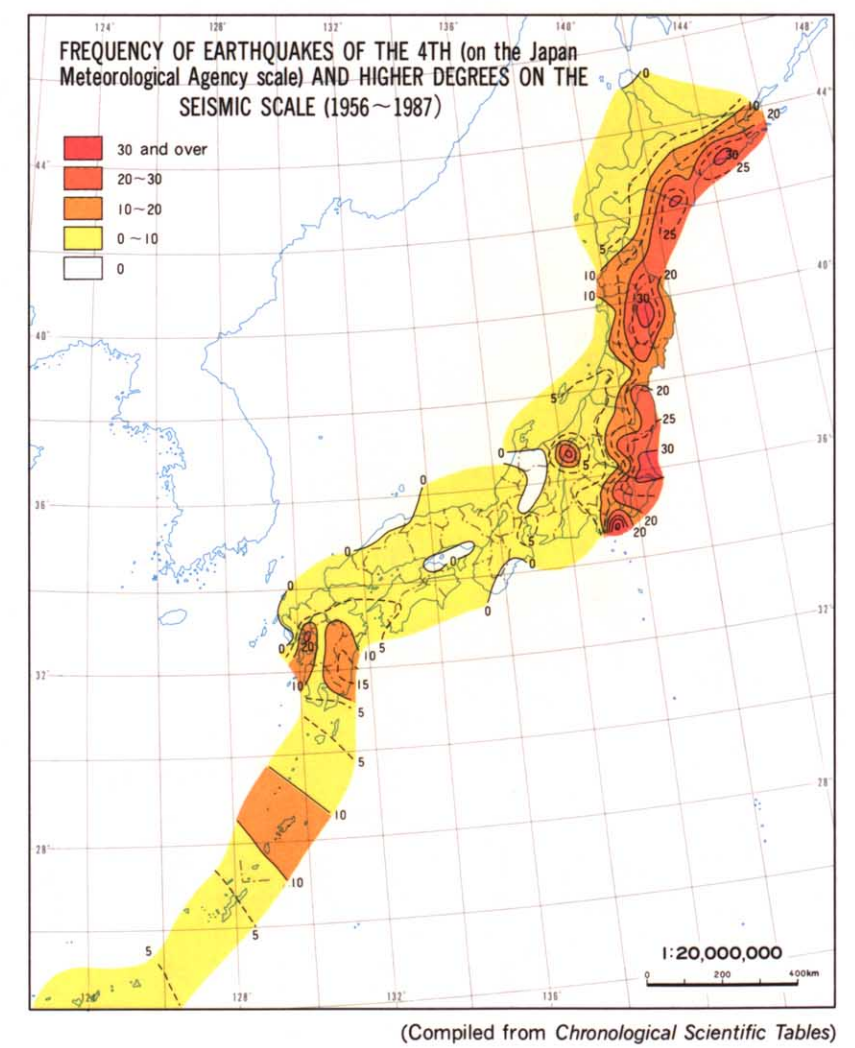
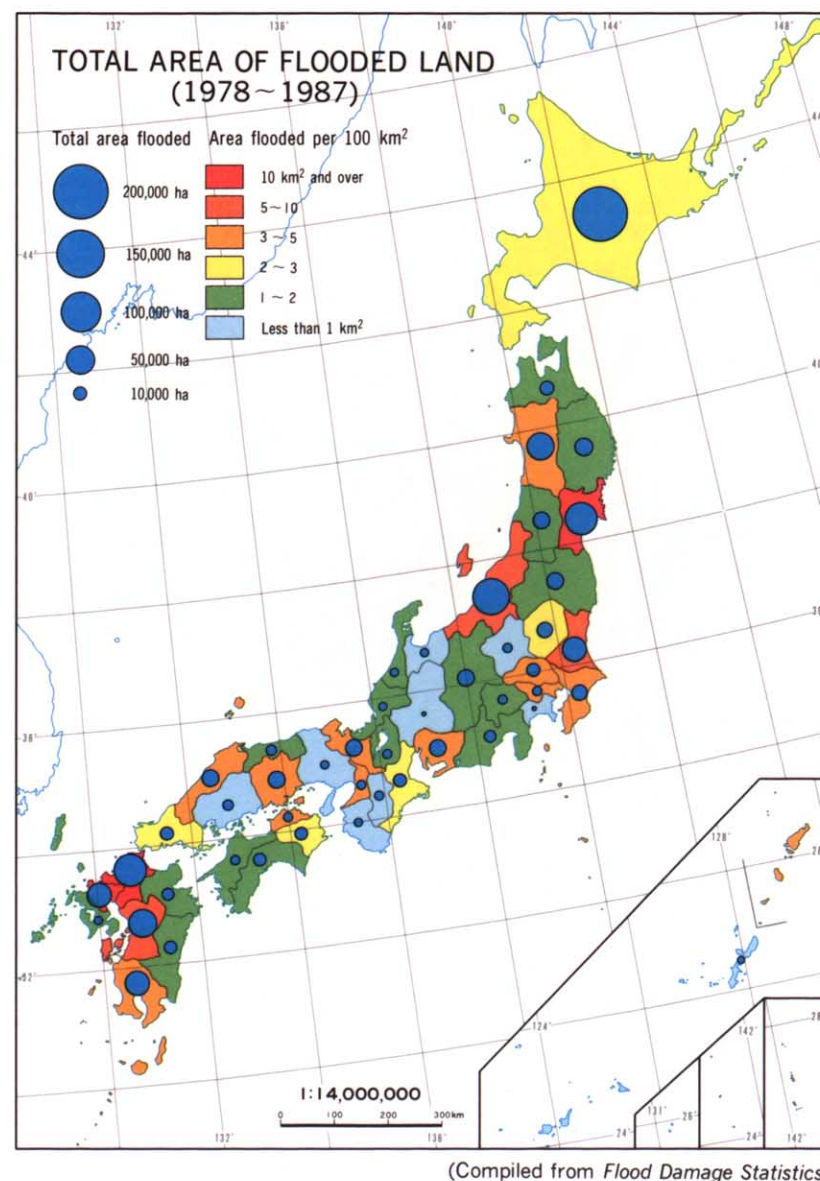
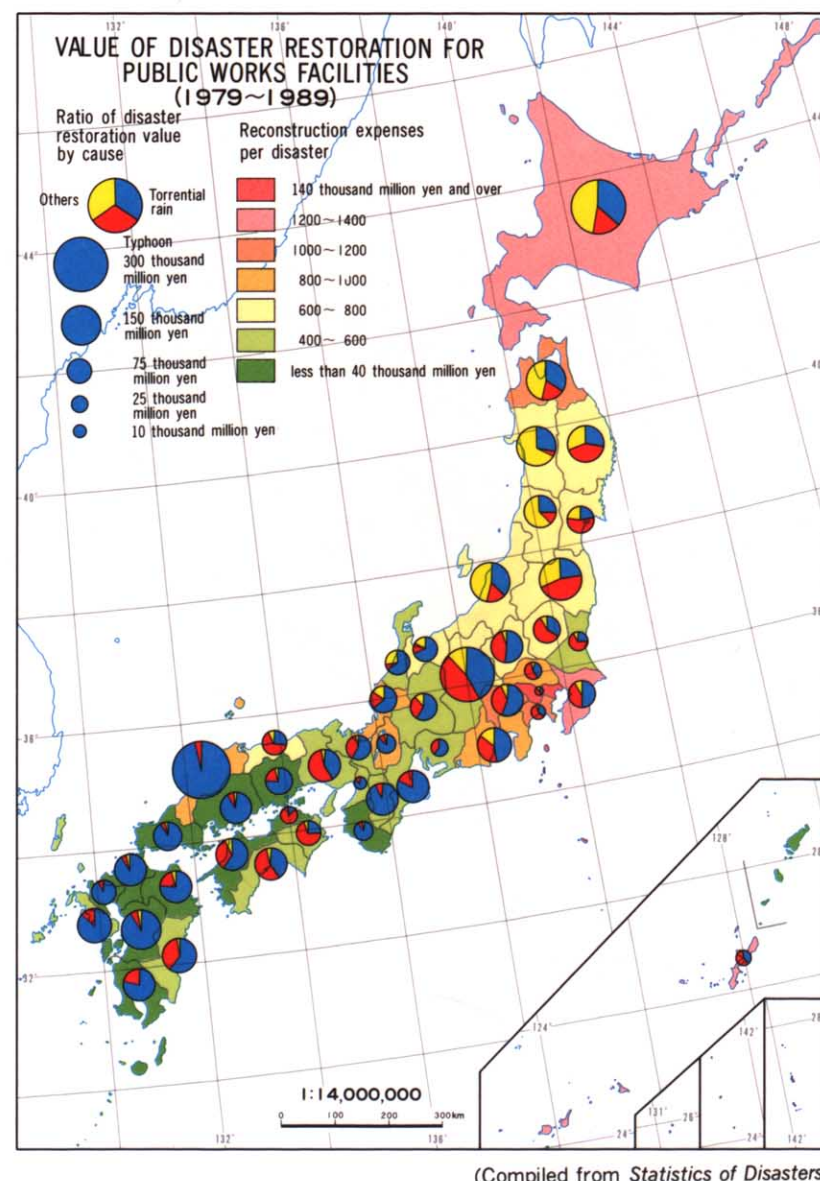
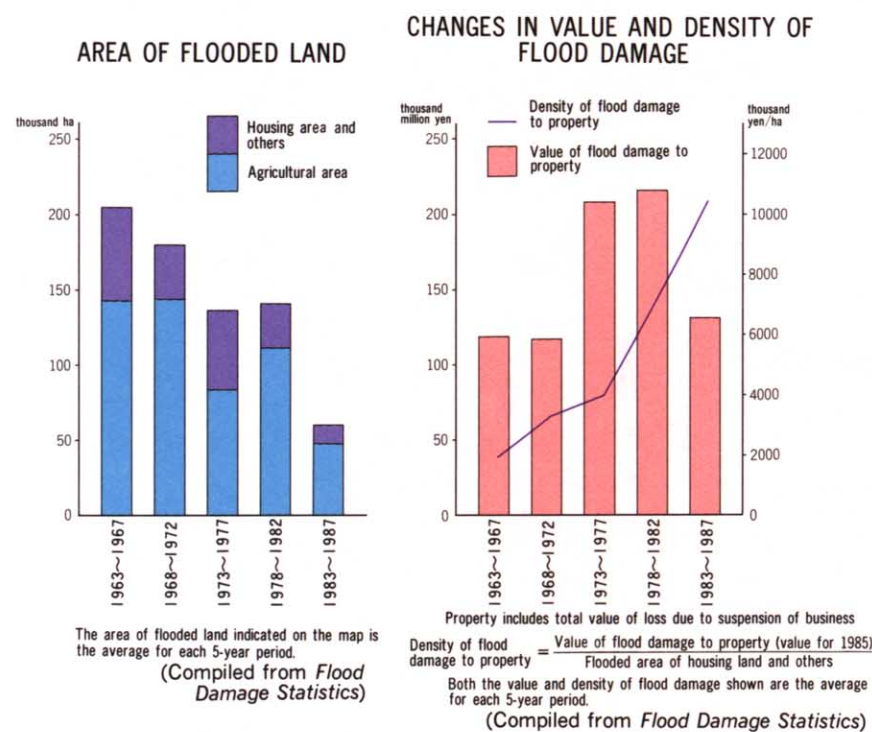
The seismic intensity scale used in Japan was determined by the Japan Meteorological Agency based on bodily sensation and the degree of damage caused. On this scale, earthquakes causing damage will have an intensity of V or over.

[Salient Points of the Legend and Map Compilation]

Nine major earthquakes which have occurred since 1900 and caused great damage were selected, and their epicenter and distribution of intensity on the Japan Meteorological Agency scale indicated.

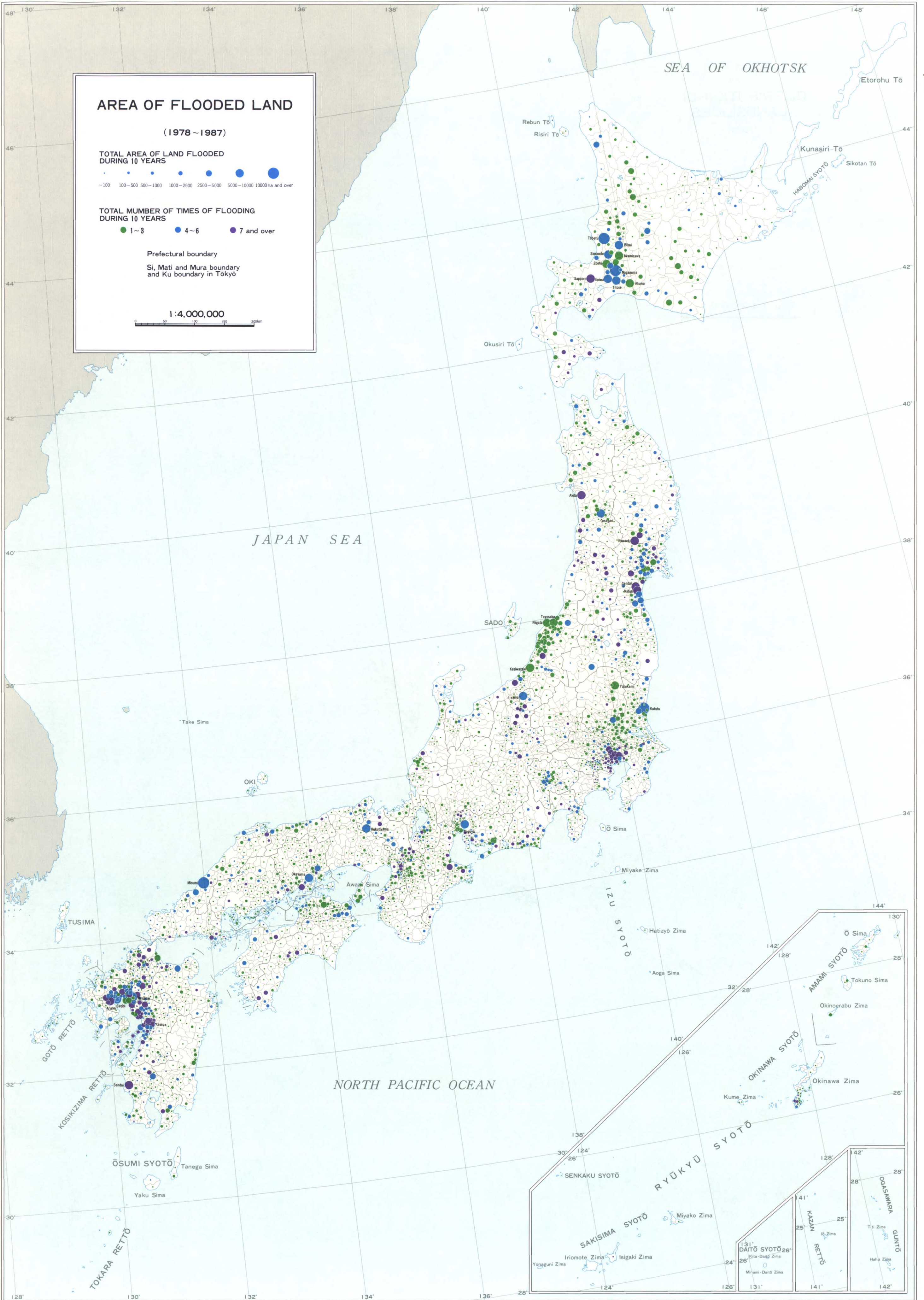
[Sources]

1. Ministry of Construction, *Flood Damage Statistics (1978-1989)*
2. National Land Agency, *White Paper on Disaster Prevention, 1989*
3. Usami T., *Materials for Comprehensive List of Destructive Earthquakes in Japan*, University of Tōkyō Press, 1989
4. National Astronomical Observatory, *Chronological Scientific Tables, 1989*
5. Watanabe H., *Comprehensive List of Destructive Tsunamis*, University of Tōkyō Press, 1985
6. Japan Meteorological Agency, *Guideline of Earthquake Observation (Reference) Appendix 6, Distribution of Major Earthquake in Japan, 1968*
7. Japan Meteorological Agency, *Technical Report, No.68, 95, 106, 1969-1984*
8. Ministry of Agriculture, Forestry and Fisheries data
9. Ministry of Construction data
10. Prefectural data



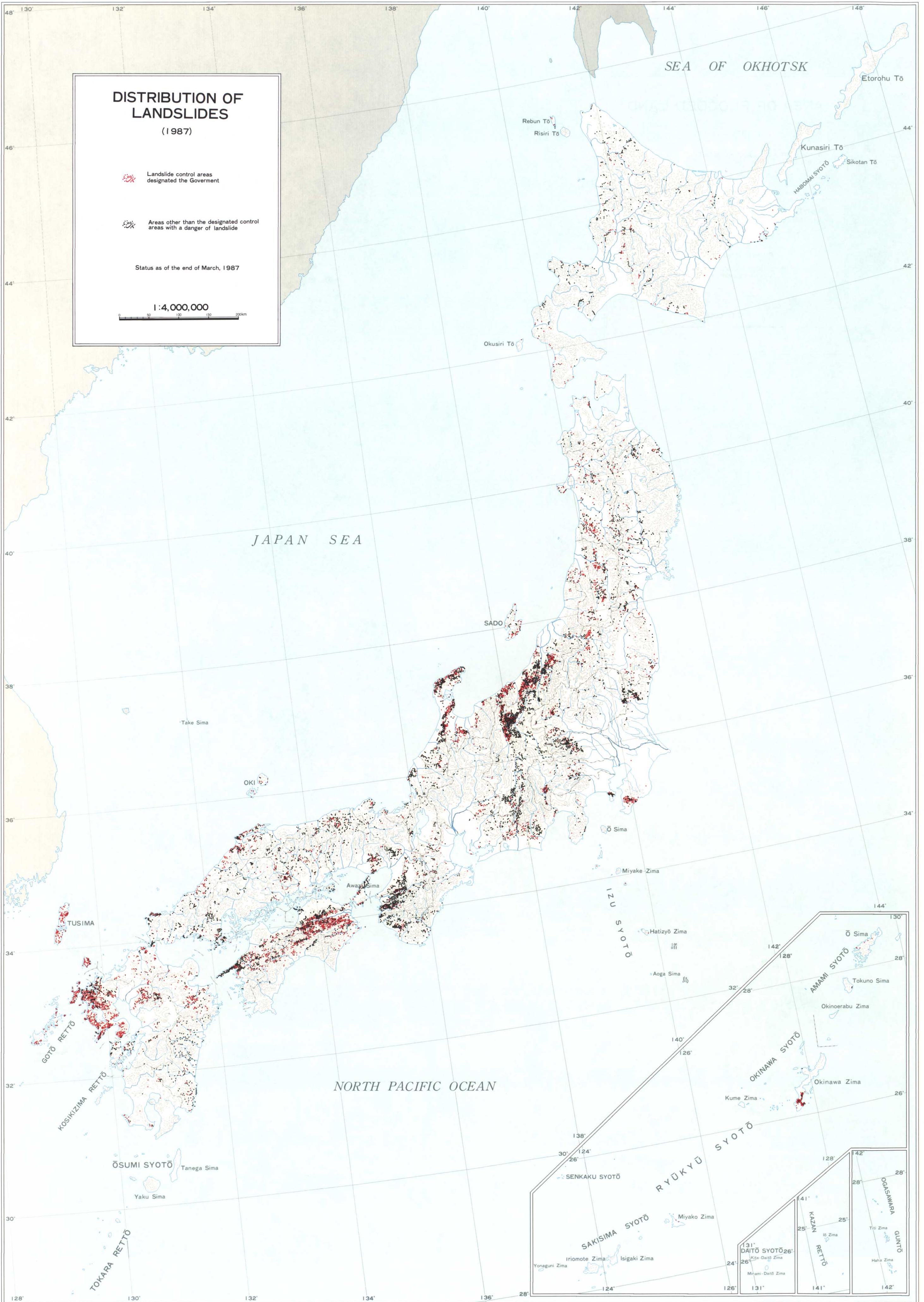
SEISMIC SCALES

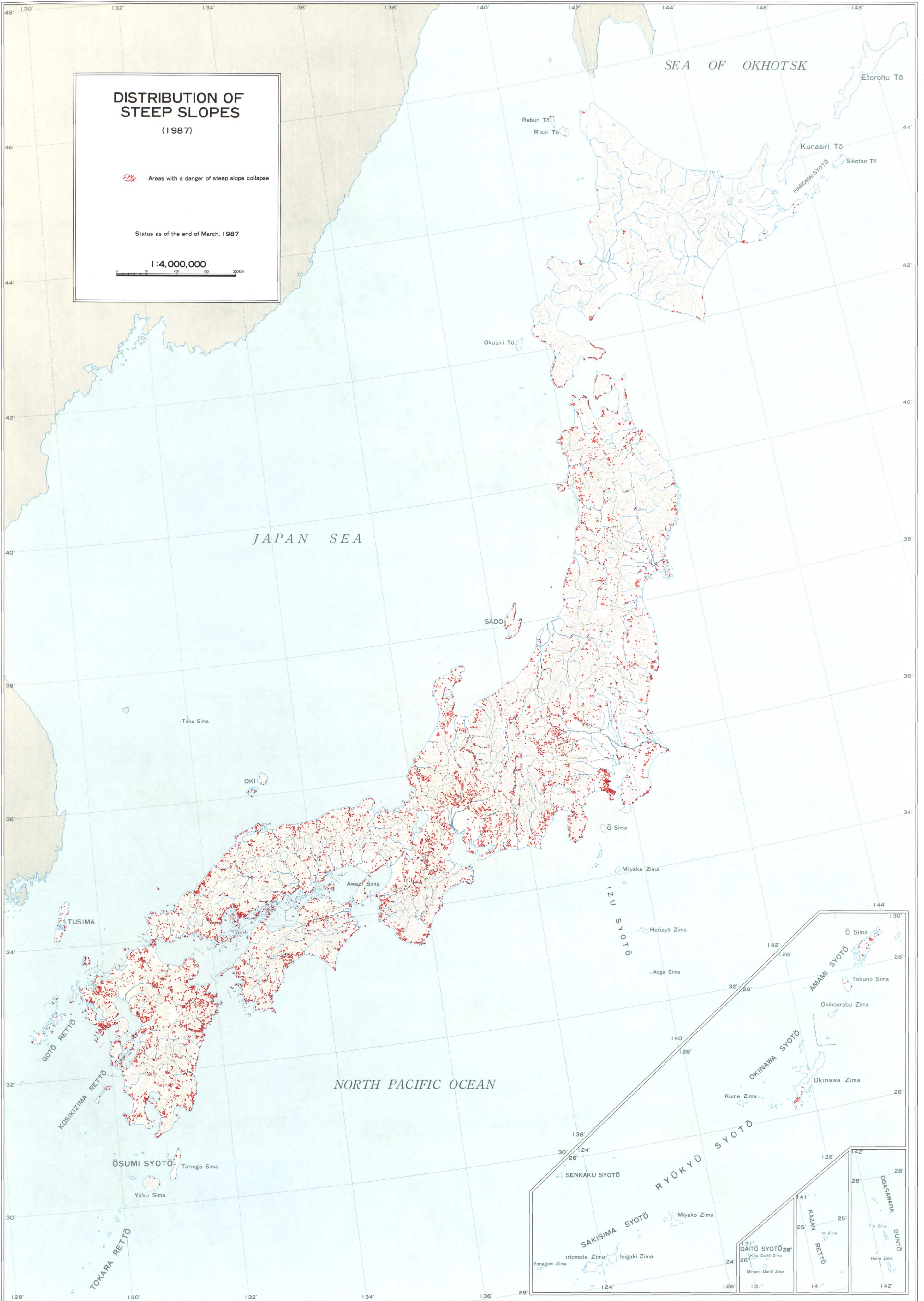
Japan Meteorological Agency scale	0	I	II	III	IV	V	VI	VII	VIII
	Unfelt earthquake	Slight earthquake	Weak earthquake	Rather strong earthquake	Strong earthquake	Very strong earthquake	Very strong earthquake	Very strong earthquake	Very Disastrous earthquake
Modified Mercalli scale	I	II	III	IV	V	VI	VII	VIII	IX
M.S.K. scale	I	II	III	IV	V	VI	VII	VIII	IX
Acceleration (g)	0.00	0.1	0.2	0.3	0.5	1.0	2.0	5.0	10.0
Acceleration (cm/s ²)	0	1	2	3	5	10	20	50	100



DISTRIBUTION OF LANDSLIDES

18.2





18.4

