Long-term earthquake forecasts in Japan from 1996 to 2002

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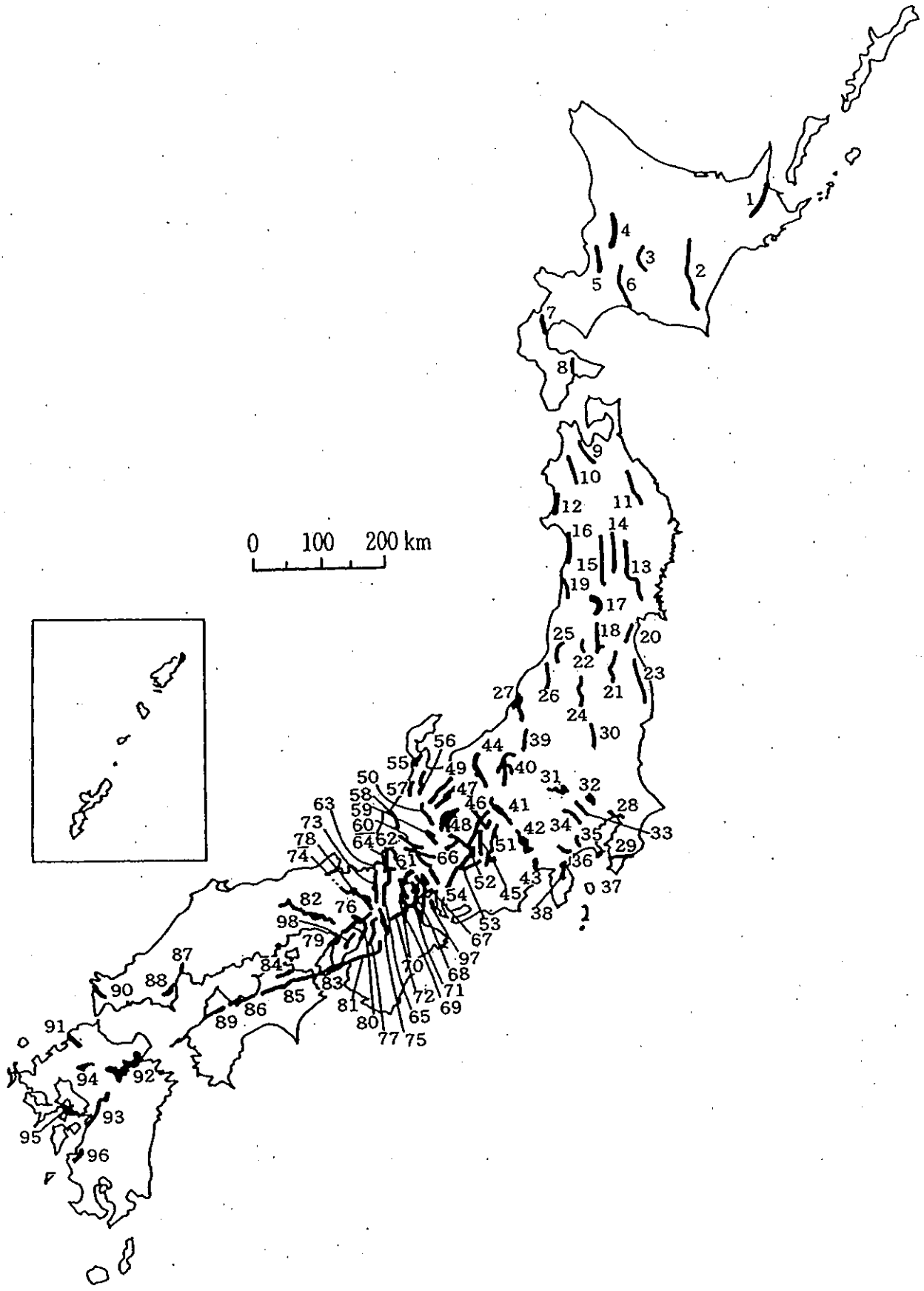
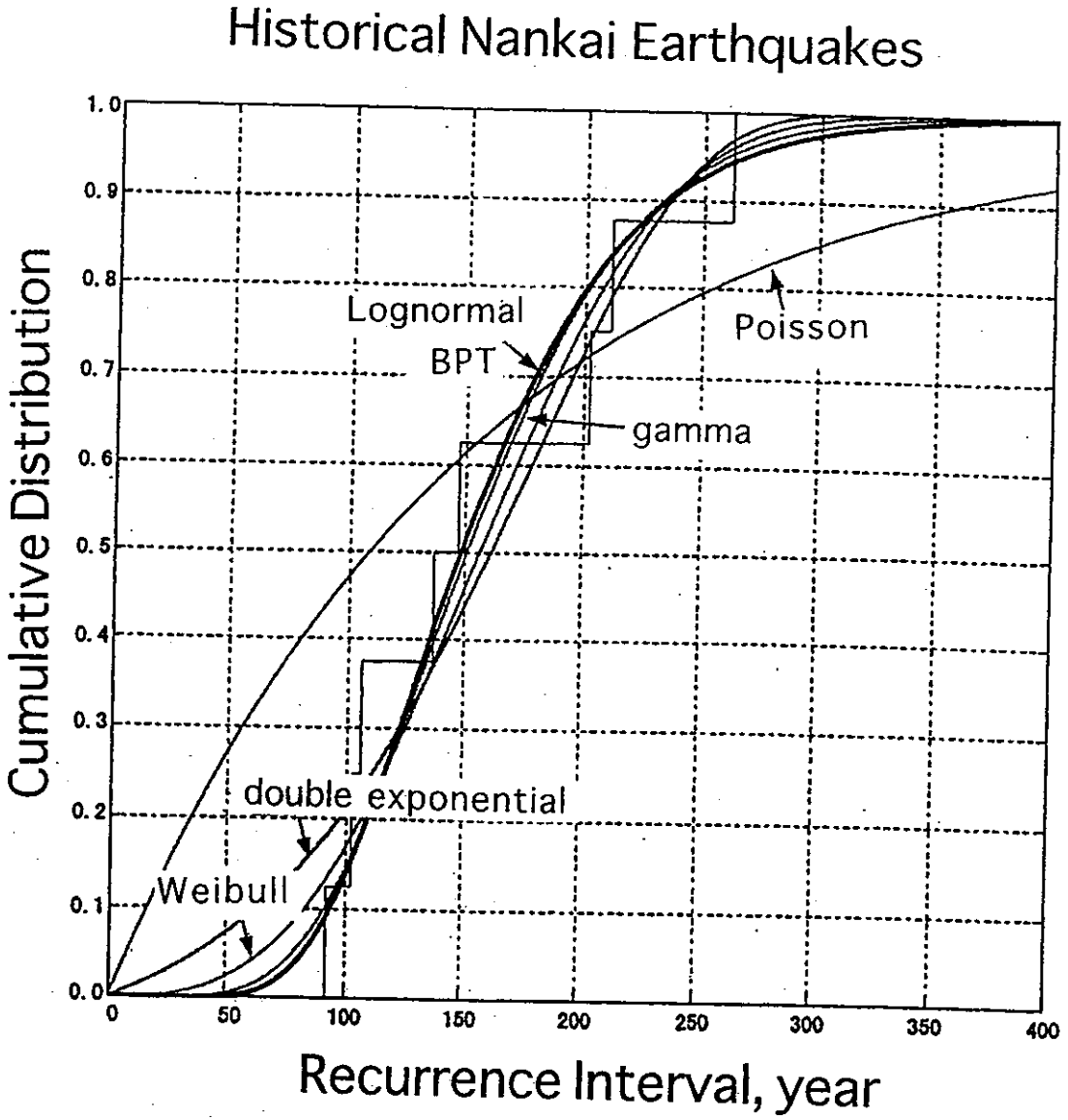


Active fault zones subject to the national basic survey of earthquakes.

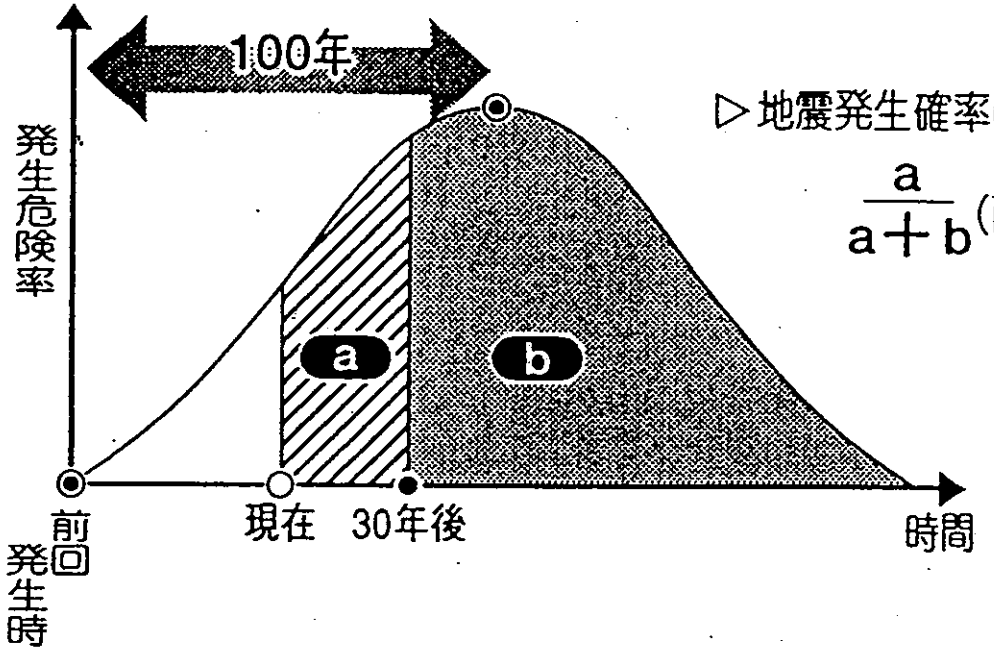


Cumulative distribution of repeat times of historical Nankai earthquakes and the distribution functions for six renewal models fitting the Nankai sequence.

30-yr conditional probability explained in newspapers (after KYODOTSUSHIN news agency, 1998)

地震発生確率の考え方(30年で評価した場合)

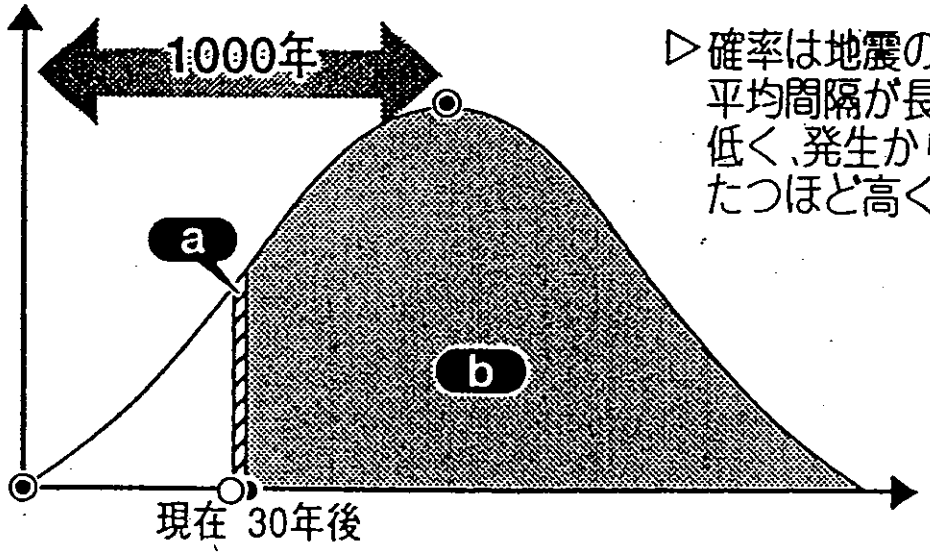
❶ プレート境界地震(平均活動間隔100年と仮定)



▷地震発生確率は

$$\frac{a}{a+b}$$(面積)

❷ 陸域の地震(平均活動間隔1000年と仮定)



▷確率は地震の平均間隔が長いほど低く、発生から時間がたつほど高くなる

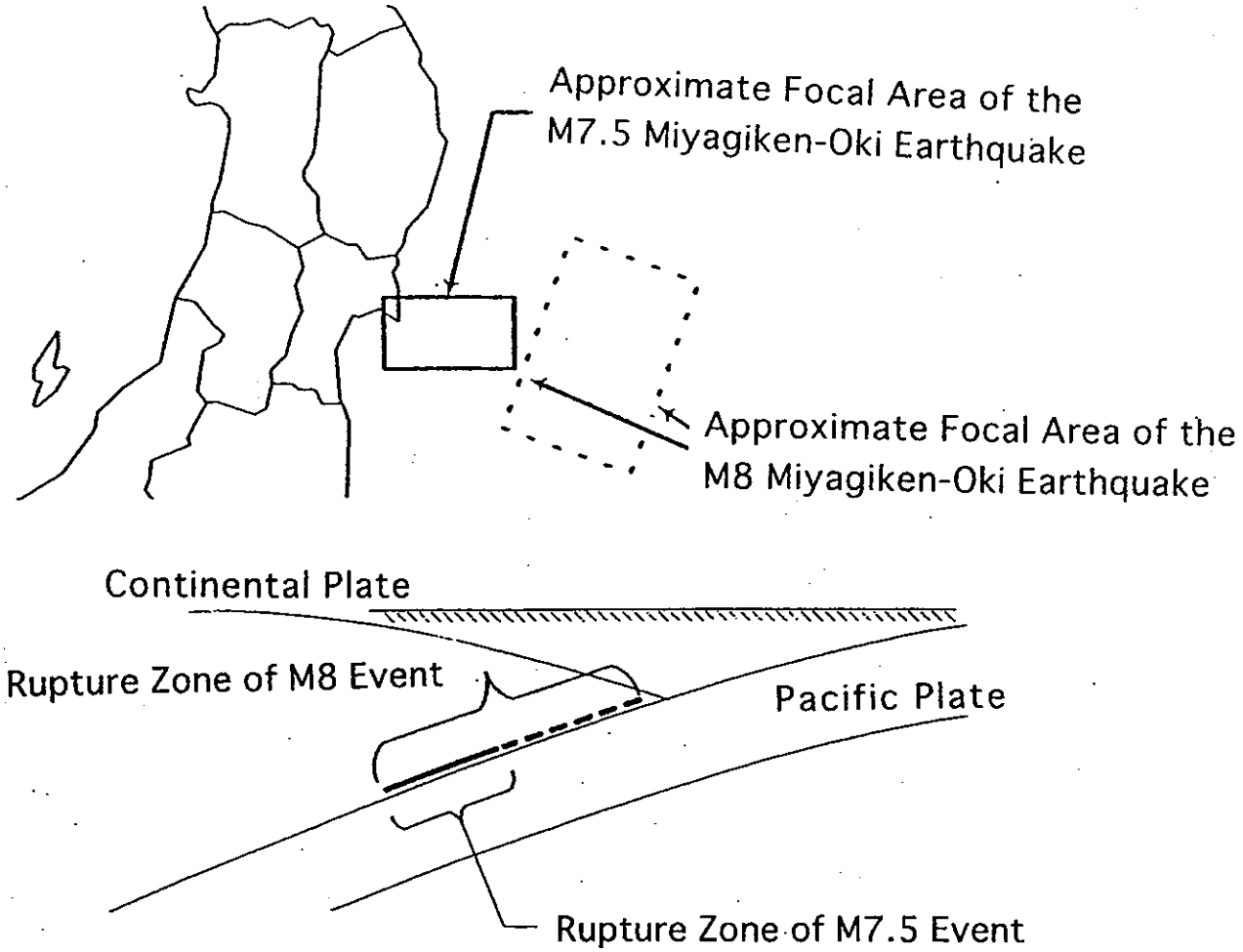
Respective α vs. Common α for BPT distribution (ERC, 2001)

Fault	Normalized Repeat Time	AIC, log L	
		μ =1.0 (Respective α)	μ =1.0 (Common α)
ATERA	0.556, 1.238, 1.153, 1.092, 0.960	5.4 (0.293)	(0.24)
TANNA	1.132, 1.252, 1.005, 0.676, 0.934	2.4 (0.213)	
ATOTSUGAWA	0.927, 1.241, 1.040, 0.792	0.8 (0.165)	
NAGANO-BON CHI-SEI'EN	0.930, 1.443, 0.747, 1.139, 1.265, 0.752, 0.711, 1.014	3.8 (0.250)	
Total AIC		12.3	7.8

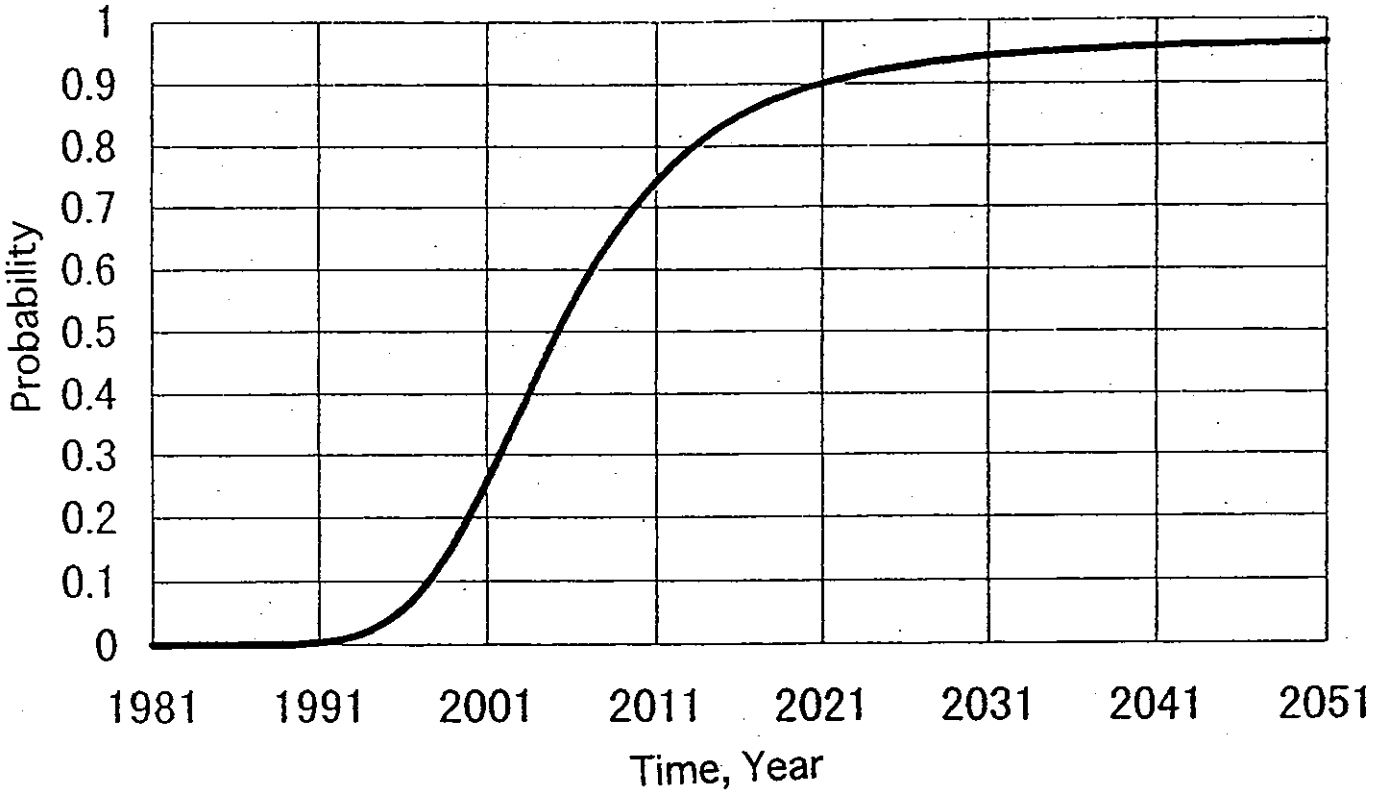
Seismic Hazard Levels for Active Faults

30-yr Probability	Description	Classified Faults
3% or higher	Relatively HIGH	Itoigawa-Shizuoka T. L., Fujikawakako, Yamagata-Bonchi, Kushigata-Sammyaku, Inadani-Kyokai, Inadani-Zen'en, Futagawa-Hinagu, Narabonchi-Toen, Morimoto-Togashi, Kannawa-Kozu-Matsuda
0.1-3%	Slightly High	Shinjo-Bonchi, Hakodate-Heiya-Sei'en, Nagamachi-Rifu, Tsukioka, Shirako-Noma, Yoro-Kuwana-Yokkaichi, Suzuka-Toen, Ikoma
Less than 0.1%	None	Arima-Takatsuki, Kitakami-Teichi-Sei'en, Nagano-Bonchi-Seien

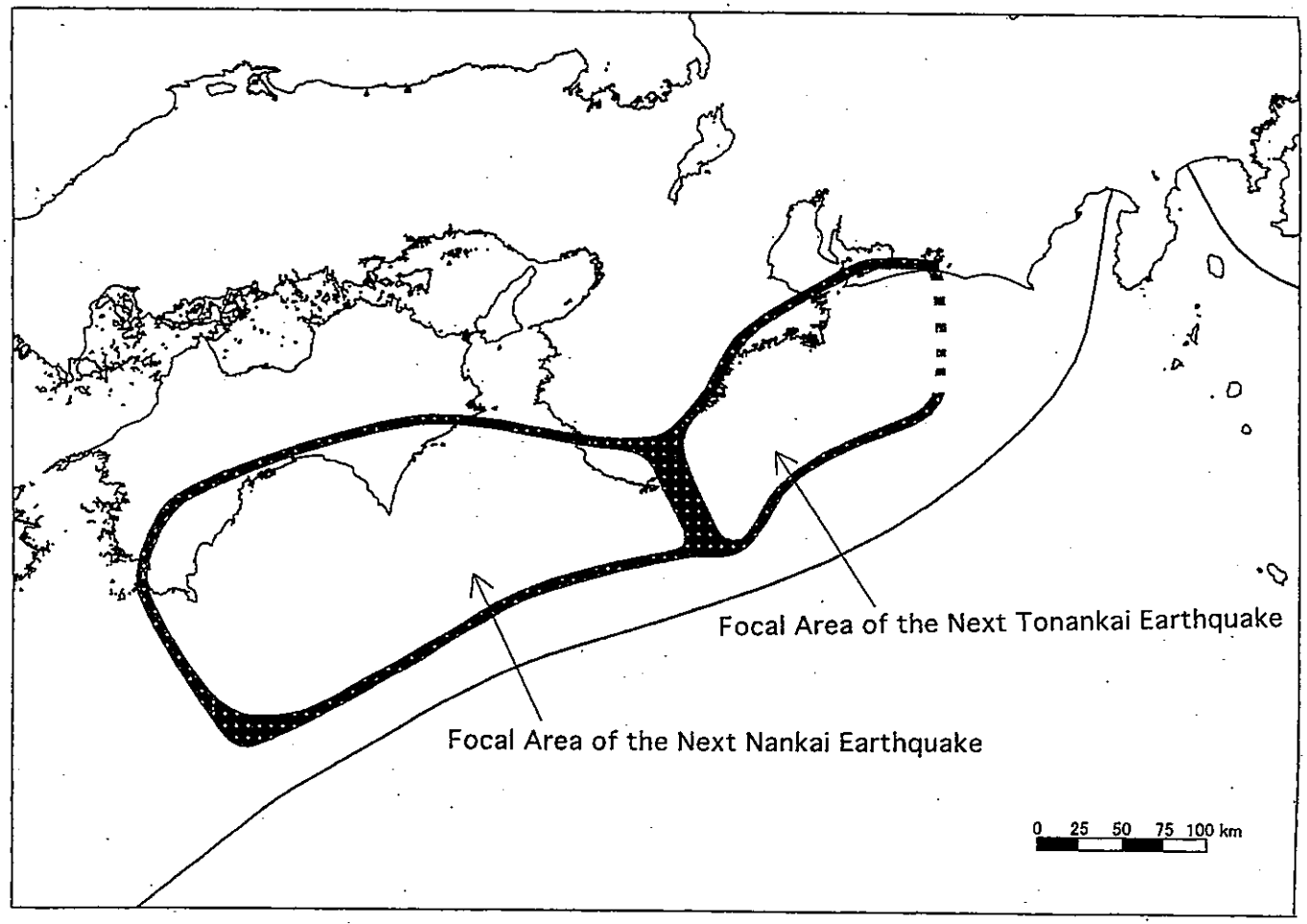
Maximum probability is used for classification when uncertainty is shown.



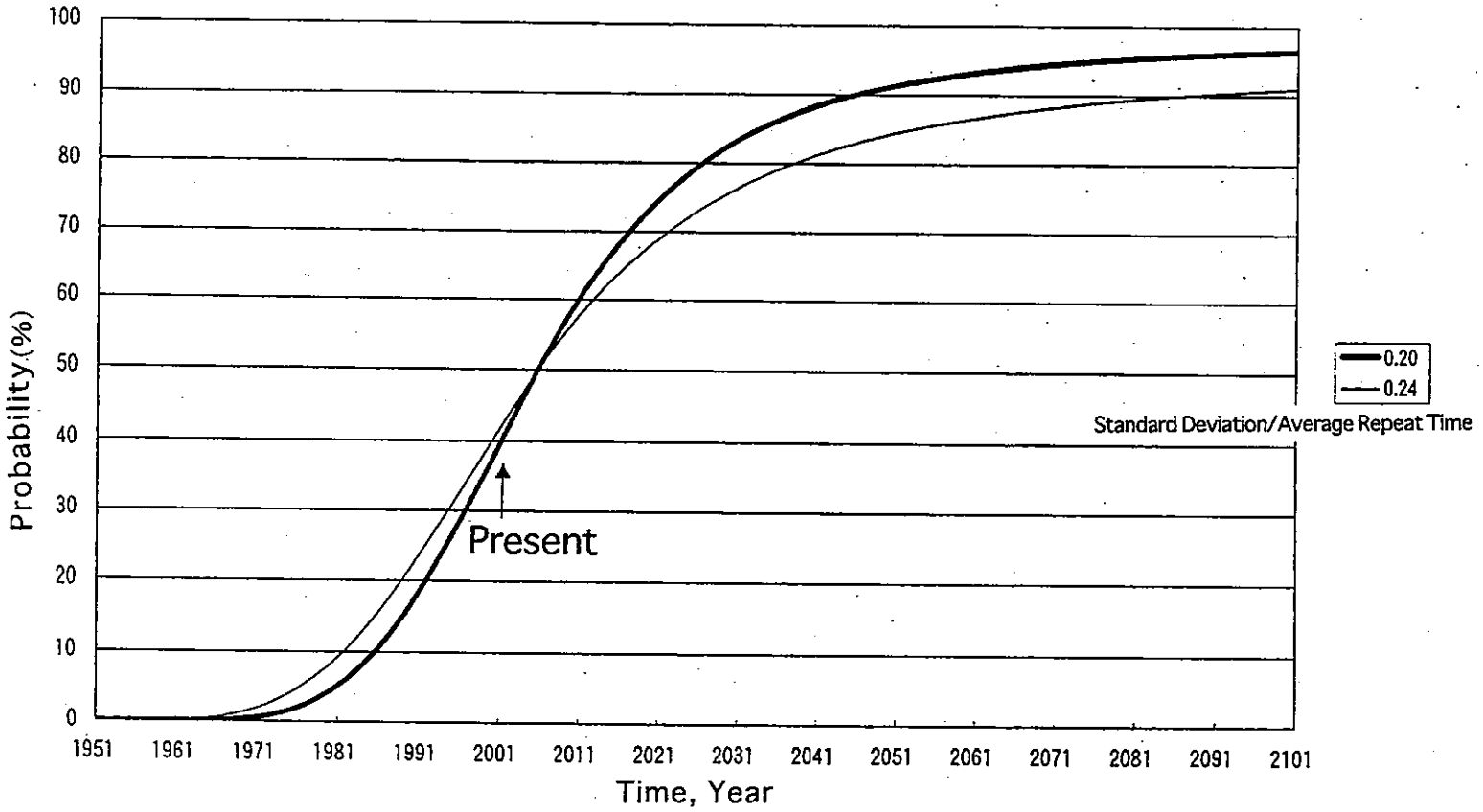
Approximate extent of the next Miyagi-Oki earthquake (original figures provided by Earthquake Research Division, Ministry of Education, Culture, Sports, Science, and Technology).



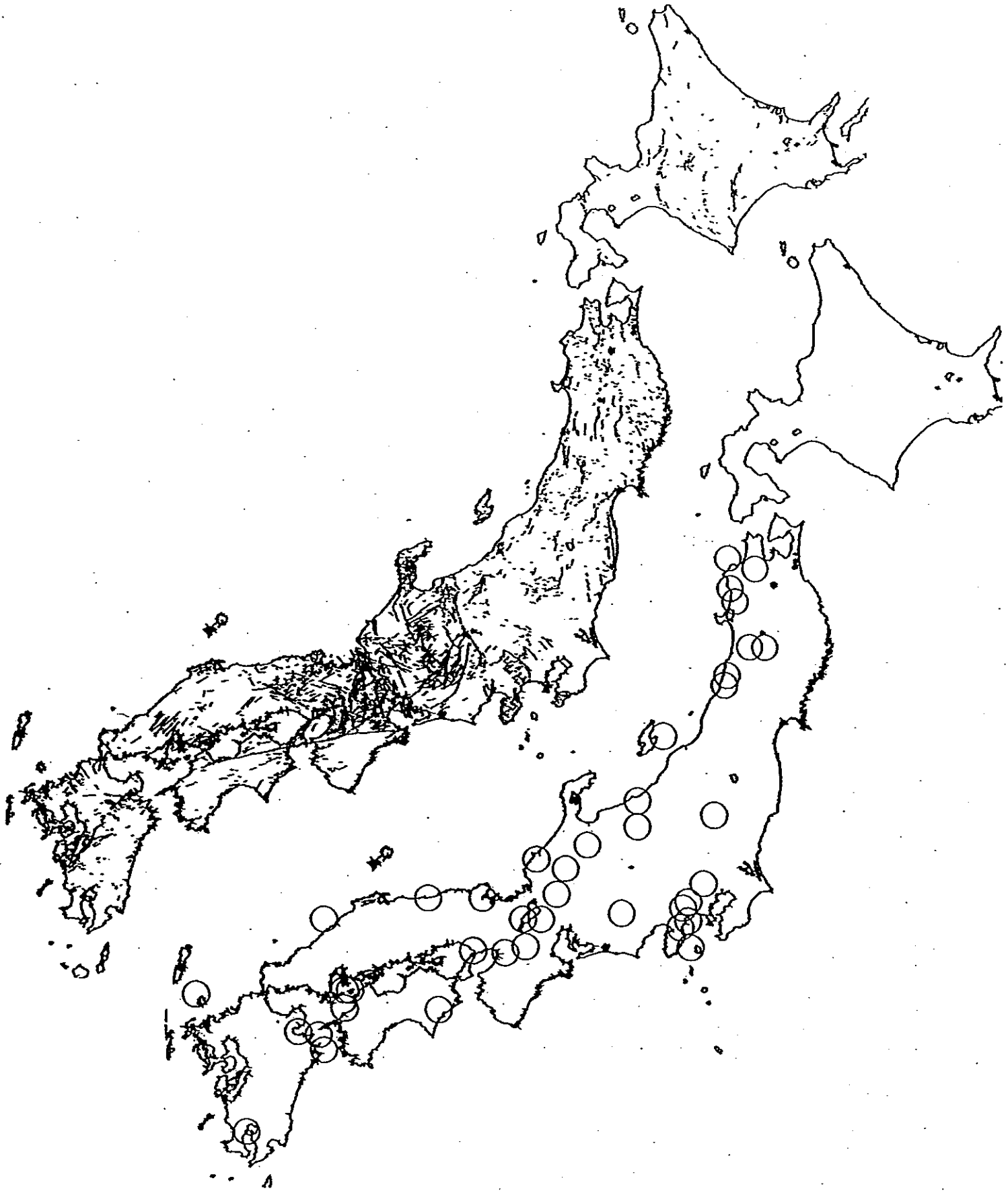
Time variation of ten-year probability for an occurrence of the Miyagi-Oki earthquake (Earthquake Research Committee, Headquarters of Earthquake Research Promotion, 2000).



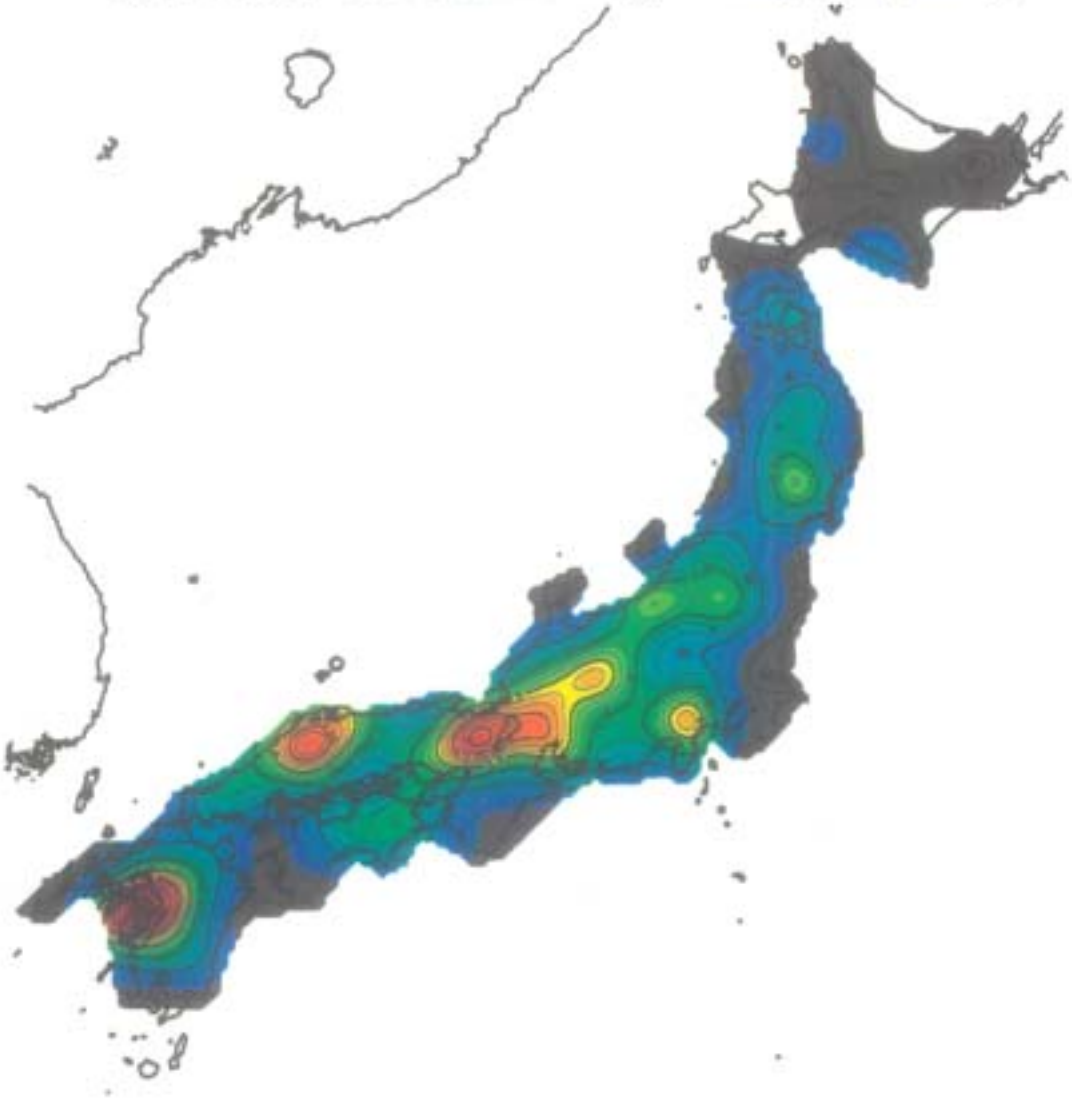
Source regions of the next Tonankai and Nankai earthquakes (original figure provided by Earthquake Research Division, Ministry of Education, Culture, Sports, Science, and Technology).

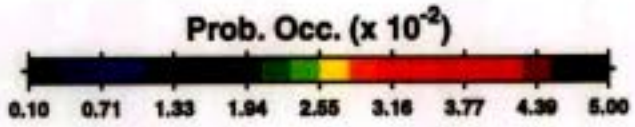


Time variation of thirty-year probability of occurrence of the Nankai earthquake (Earthquake Research Committee, Headquarters of Earthquake Research Promotion, 2001b).

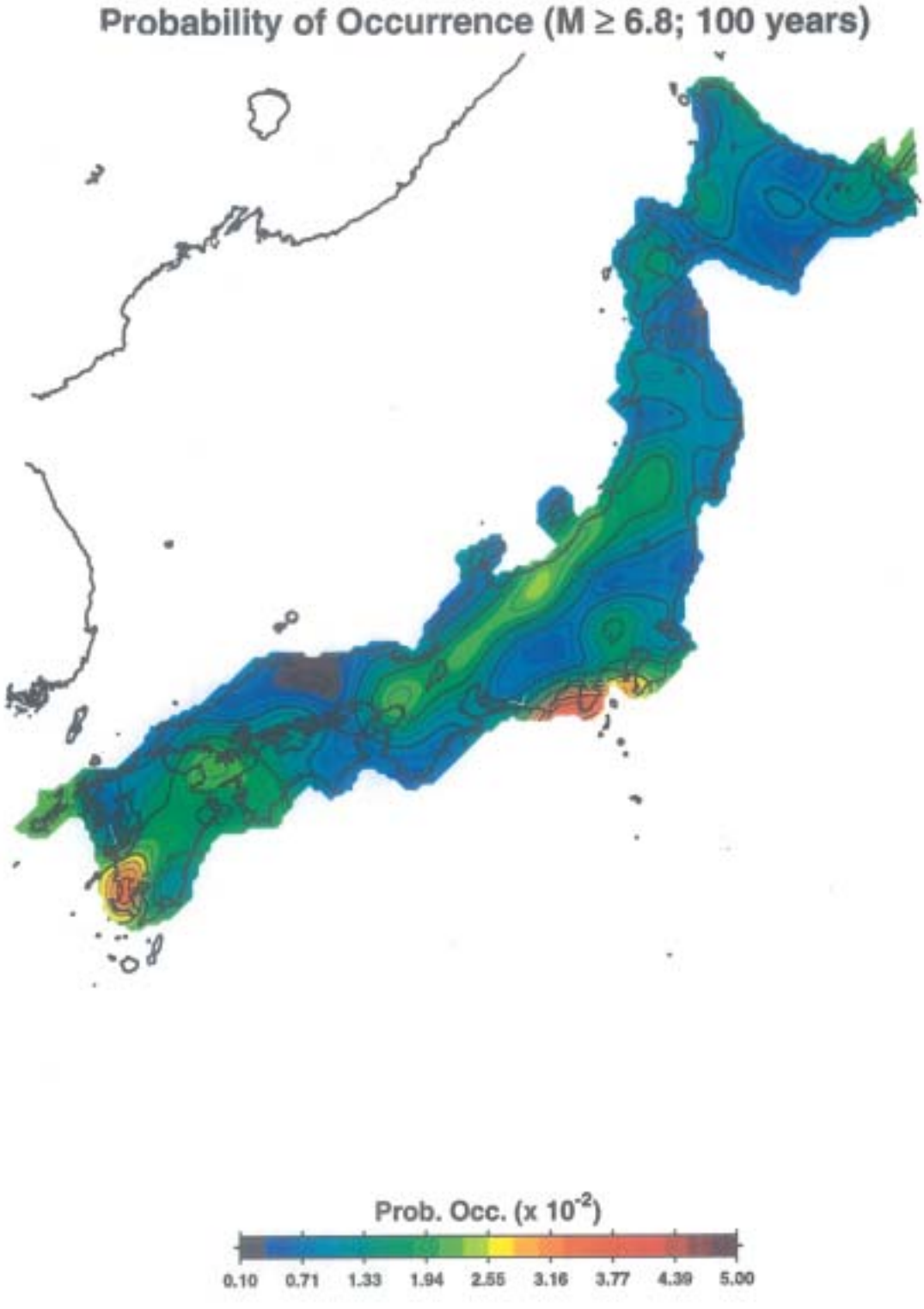


Probability of Occurrence (M ≥ 6.8; 100 years)





(Shimazaki and Wahyu, 2001)



[Ward; Backslip Considered]

(Shimazaki and Wahyu, 2001)

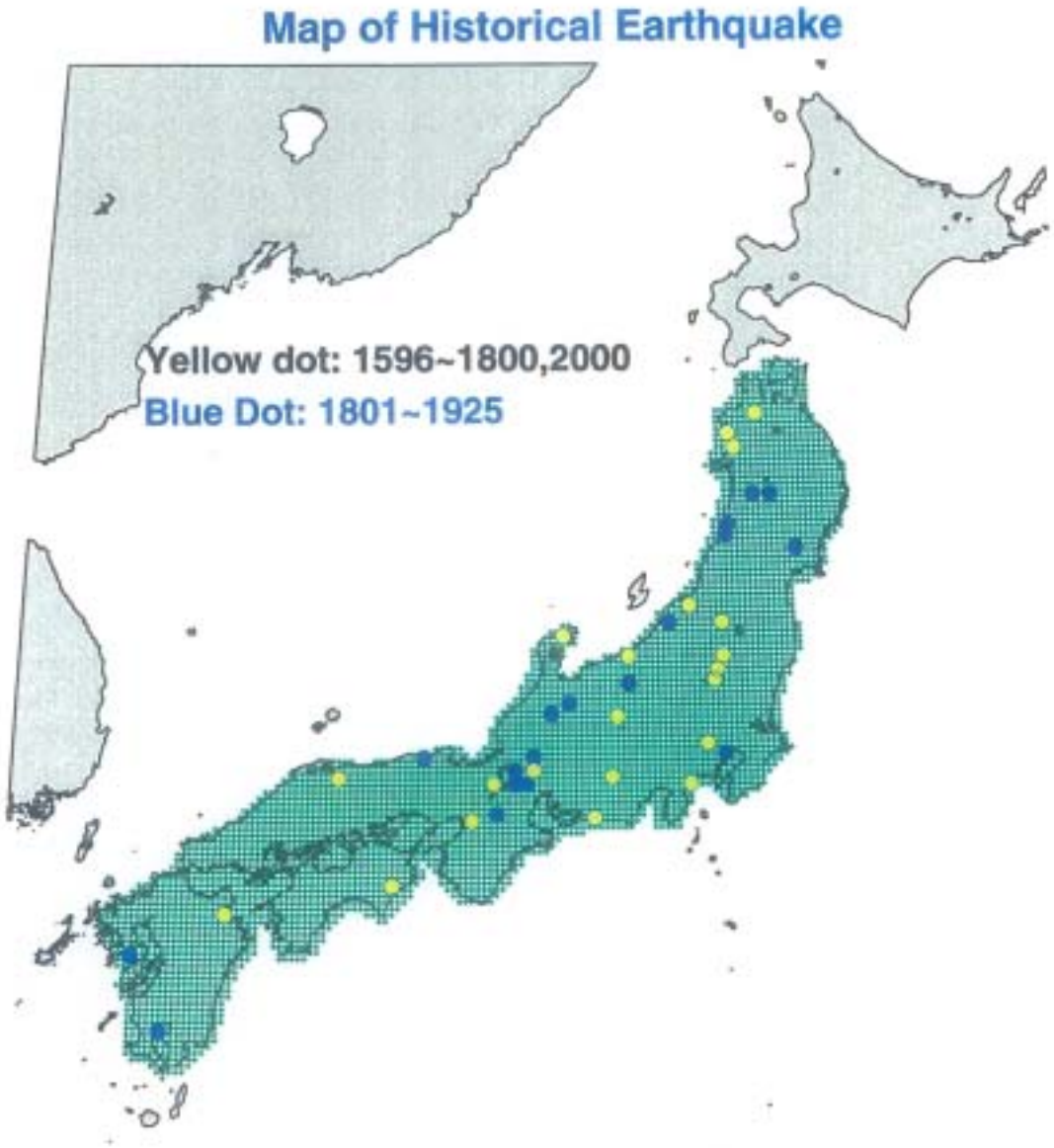
Historical " (1596-1800,2000) & (1801-1925)"

$$\delta AIC = -(AIC_{model} - AIC_{background})$$

Models		δAIC: 1596-1800,2000	1801-1925
Eq. Catalog	Modified Frankel	1.8	3.6
	Small Earthquakes	-1.3	5.7
	Moderate Earthquakes	0.5	-2.7
Faults	Max. Length	2.1	7.8
Zoning			
PCIRO-Japan	Given	-2.7	-3.8
(2000)	Small Earthquakes	4.4	5.1
	Moderate Earthquakes	-3.7	-7.7
Matsuda	Small Earthquakes	3.2	8.2
(1981)	Moderate Earthquakes	3.0	3.9
GPS:	Ward	-8.2	4.4
	Ward (Backslip Considered)	-5.1	5.1
Combining:	Max. Length + Zoning (PCIRO)	4.9	8.2
	Max. Length + Zoning (Matsuda)	4.9	10.6

—Testing

(Shimazaki and Wahyu, 2001)



(Shimazaki and Wahyu, 2001)