

"Intermediate term forecast" based on seismic intensity data base for understanding the usual seismicity

*Tetsuro Imakiire¹, Naoji Koizumi²

1.GSI of Japan, 2.School of Environmental Science, The University of Shiga Prefecture

It is preferable to determine the individual action for seismic risk mitigation based on the correct knowledge of earthquakes. Although no reliable method to forecast the great earthquakes, which would cause serious damages, in short term, some seismic hazard information such as probabilistic hazard maps by the Headquarters for Earthquake Research Promotion based on long term evaluation of the seismic activity are released. However, these long term evaluations mainly show the probability for several decades or longer term. It would be difficult to imagine the risk for the citizens, when they see the caption which says "Probabilities of ground motions equal to or larger than seismic intensity 6 Lower, occurring within 30 years from the present", within the everyday life time. On the other hand, people may experience some earthquakes with intensity 4 or 5 lower, which would not cause any damages, within several years or months. The memories of these earthquakes would continue, as they feel such earthquakes rather frequently. Even if the intensity felt at their own residence would not be so strong, the news informing the strong intensity in the same prefecture should impress the people to trigger the consideration on risk management for the earthquake, personally.

The purpose of introducing the "Earthquake forecast" in our report is NOT to propose an original physical model nor statistical model developing the reliable method for earthquake forecast or prediction through the scientific discussion. The main purpose of this report is to introduce simple example to citizens to understand the common seismic activity based on the usual seismicity data. Therefore, we choose the seismic intensity database of JMA, not the earthquake catalog, to provide the parameters for our model, as intensity is easy to imagine the effect of earthquake, personally. The probability to feel fairly strong earthquake within several month to one year would be shown in a simple format understandable by anybody. Such kind of simple information would be helpful to realize the usual seismic activity, as well as to consider the individual risk mitigation action imaging the more destructive and less frequent earthquake occurrence.

The statistic model used for the "forecast" is Homogeneous Poisson Process, which presume minimum number of a priori parameter, the average recurrence term of the events based on the record of past events. We will show the example of "Intermediate term forecast" as the target term with three months and one year for 2015, and unit areas with each prefecture (Fig.1). As the evaluation of the "forecast" shows that the "Success rate" is around 70% to 90% and the "Alarm rate" is over 50%, it would be appropriate to understand usual seismic activity through this "forecast" like idea.

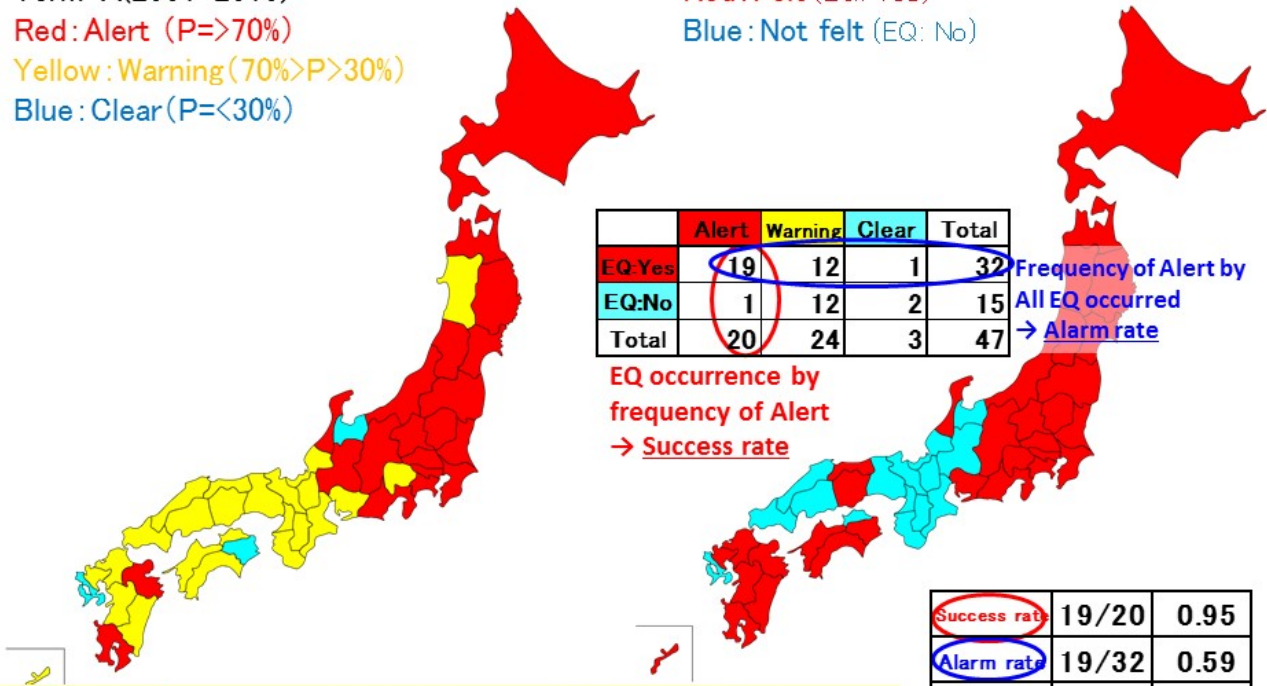
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One year “Forecast” for 2015
based on the seismicity of
Term-A(2001–2010)

Red: Alert ($P \geq 70\%$)
Yellow: Warning ($70\% > P \geq 30\%$)
Blue: Clear ($P < 30\%$)

Result :EQ felt in the prefectures
over intensity level 4 during 2015

Red: Felt (EQ: Yes)
Blue: Not felt (EQ: No)



“EQ: Yes” means one or more earthquake(s) was(were) felt and
“EQ: No” means no earthquake was felt during 2015 in that prefecture.

Success rate	19/20	0.95
Alarm rate	19/32	0.59
“Safe” rate	2/3	0.67

Fig.1 One year “Forecast” and “Result” for 2015