Trials to predict the number of aftershocks in Japan in 2003

Ken'ichiro Yamashina[1]

[1] Earthq. Res. Inst., Univ. Tokyo

A plausible range of the number of aftershocks was tried to predict with respect to three major earthquakes in Japan in 2003 (i.e. Off Miyagi Pref., Northern Miyagi Pref. and Off Tokachi earthquakes). In the present trial, the range of the number in a certain time period was taken to be the 5-95% points of the Poisson distribution with an expected number N (or the 0-90% points, when the 5% point decreases to zero; Yamashina, 2000, BERI, vol.75). Here, the expected number was obtained from the modified Omori formula after estimating the parameters in the formula by a maximum likelihood method. However the parameters may sometimes be unreliable because of a lack of sufficient data or incompleteness of the tentative list of aftershocks which have occurred before the time of prediction. Accordingly, we assume a factor of uncertainty (1.5 in many cases), and the expected number N was replaced by, for example, N/1.5 and 1.5N. In the 242 trials of predictions in 2003, a high rate of success was obtained just as expected previously, i.e. around 95% because of the assumption of the uncertainty, suggesting a hope to the practical use.