**S220-006** **Room: 303** **Time: May 20 15:00-15:15**

# A method to evaluate the reliability of prediction

# Ken'ichiro Yamashina[1]

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

In 2x2 contingency table, Molchan or ROC diagrams are used frequently to indicate the significance of the prediction. Here, the former and the latter usually represent the failures-to-predict(n21/(n11+n21)) vs. rate-of-alarms((n11+n12)/n) and the hit-rate(n11/(n11+n21)) vs. false-alarms-against-fraction-of-no-events(n12/(n12+n22)), respectively. Notations of the numbers are as follows. n:total(n=n11+n12+n21+n22), n11:successful alarm, n12:false alarm, n21:incorrect alarmless(occurrence of events without alarm), n22:correct alarmless(no events with no alarm).

Those diagrams might be impressive visually. However, it is somewhat subjective and difficult to represent the probabilistic exact distance from a random process unless all of the respective numbers are very large. In addition, the rate-of-successful-alarm(n11/(n11+n12)) will be the most requested information to think about the reliability of the prediction. Consequently, confidence-level vs. rate-of-successful-alarm will be useful to plot the results of the predictions. The confidence level for the finite numbers of nij is able to be obtained by simulation using the maximum likelyhood estimation of the parameters of random process, i.e. pij=(ni1+ni2)(n1j+n2j)/n/n. Here, {expectation of nij}= n pij, and p11+p12+p21+p22=1.