IMPROVED EVALUATION OF CHINESE ANNUAL EARTHQUAKE PREDICTIONS

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China Seismological Bureau (CSB), formerly State Seismological Bureau (SSB), has been making annual earthquake predictions since the seventies. The predictions are made at the "national consultative meeting on seismic tendency" in January each year. These predictions are recorded in official documents to inform ministries of the State Council and provincial governments, but kept classified during the entire predicted year to avoid unnecessary social panic. In this work, we review the Chinese prediction work, and apply a scheme of R score to evaluate the disclosed annual predictions. The entire monitored area of China is divided into 0.5X0.5 degree cells, magnitude of earthquake prediction and occurrence is assigned as the third dimension at a M=0.5 interval. By counting the numbers of 3-D cubes of prediction and actual occurrence, we use a R score scheme to evaeluate the prediction. R is defined as the success rate (number of cubes earthquake predicted and occurred / number of earthquake occurred, and defined zero when no earthquake at the magnitude interval of prediction occurred) subtracts false alarm rate (number of cubes earthquake predicted but not occurred / number of cubes no earthquakes occurred). It approaches 0 for completely random guess and approaches +1 for complete successful predictions if background probability of earthquake occurrence is the same for all cells. The average R score of the annual prediction in China from 1990 to 2002 is about 0.12, greater than 0. Best score (R=0.20) is obtained at the magnitude interval between 5.5 to 6.5. Because background seismicity is higher in seismic active regions. If this is considered in the random guess, i.e., the chance of a cube being chosen for prediction is proportional to its background seismicity, then the predictions at magnitude 6 to 7 interval is marginal higher. Although the R score fluctuates from year to year, it is interesting to note that the average R score show a trend of increase from 1900 to 2002.