EARTHQUAKE PREDICTION PROBLEMS IN THE USSR

M.A. Sadovsky and I.L. Nersesov

Institute of Physics of the Earth
Academy of Sciences of the USSR
B. Gruzinskaya 10, Moscow D-242, USSR

In the USSR, the problem of predicting the site, magnitude and time of earthquakes is an integral part of the general problem of mitigating the consequences of strong earthquakes, which also involves the prediction of seismic activity on the earth's surface as a result of strong underground shocks and seismic engineering and seismic zoning at various levels: general zoning, detailed zoning and microzoning.

In essence, seismic zoning is also a method of predicting strong earthquakes, but one which provides long-term assessments of the possible intensity and average recurrence of earthquakes in a given zone without regard to the precise site and time of their occurence. In predictions of the time of an earthquake, on the other hand, we try to monitor conditions in a seismic area continuously in order to determine those changes in geophysical fields which precede a strong shock and which can explain its location and time of occurrence.

At the same time, it should be emphasized that the methods of zoning and long-term prediction are based on the same data: recent tectonics, geomorphology, seismological data collected over the longest possible time interval, the nature of the mechanisms of earthquake foci, the spectral characteristics of seismic waves, etc., as well as on geodesic data. All this information is collected in respect of fairly large areas of substantially greater size than that of a single earthquake focus. For example, the new seismic zoning map of USSR territory (Fig.1) assesses not only the intensity but also the probability of occurrence of strong earthquakes in the Kamchatka area. This method of combining zoning maps with long-term assessment of seismic hazards will probably be applied in future in respect of all seismic areas in the Soviet Union.

Long-term prediction occupies a particularly important place in the over-all issue of earthquake prediction because it is through the development and perfecting of this technique that the State is increasingly able to take the most effective measures against the possible consequences of strong earthquakes by reinforcing weak buildings, choosing appropriate sites for