Test of the algorithm RTP for predicting large earthquakes months in advance.

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We describe the ongoing test of the algorithm "RTP"(Reverse Tracing of Precursors) for short-term (months in advance) prediction of strong earthquakes. Algorithm is based on integration of geodynamical models of fault networks, models of non-linear-dynamics type, and pattern recognition analysis of observed and modeled seismicity. Performance of the algorithm is evaluated by advance prediction in California, Japan, Middle East, and Italy with adjacent areas.

The algorithm consists of two steps. First, we detect short-term precursory phenomenon (with characteristic lead time months): rise of earthquake correlation range. This phenomenon is detected by occurrence of specific clusters of epicenters of moderate earthquakes called "earthquake chains". Second, we consider intermediate-term seismicity patterns (with characteristic lead time years) preceding occurrence of the chain in its vicinity; pattern recognition rule, "Hamming distance", helps to select premonitory earthquakes chains from false alarms. Strong earthquake is expected in the vicinity of precursory chain for time T. Retrospective analysis suggested T=9 months. For the time-space of alarm we estimate the probability that strong earthquake occurs at random. By the mean of massive retrospective tests with variation of earthquakes chains parameters, of the recognition rule, and of the aftershock elimination parameters, we estimate the probability that the alarm is false. Alarms are documented if their probability to be false is estimated as less than 0.5.

To the time of submission of the abstract, six alarms have been put on record. Two of them happened to be successful predictions (Tokachi-Oki, Japan, 2003, M=8.3;

San Simeon, California, 2004, M=6.5). Two more with the evidence confirm the method, although formally they are "near misses" due to unfortunate definition mistakes (Bovec, Slovenia, 2004, M=5.6 and two quakes near Honsu, Japan, 5 Sept. 2004, M=7.4 and M=7.2). One alarm happened to be false (Southern California). One alarm remains current until mid-August, 2005 (Southern California).