



Long-range activation of seismicity prior to largest earthquakes ($M_w >= 8.3$)

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Rise of earthquake correlation range prior to large seismic events, predicted by models and then found in real seismicity (Shebalin et al., 2000; Zoller et al., 2001; Zaliapin et al., 2002) recently met new confirmations. The Simushir earthquake, Kuril islands, November 15, 2006, $M_w=8.3$ and a subsequent large earthquake in same area, January 13, 2007, $M_w=8.1$ have been successfully predicted in advance by the algorithm Reverse Tracing of Precursors (RTP) (<http://www.ipgp.ucla.edu/prediction/rtp/>). The algorithm is based on the analysis of the earthquake chains, clusters of moderate-size earthquakes which extend over large distances and are formed by statistically rare pairs of close in space and time events. Earthquake chains reveal relatively short-term long-range activation of seismicity.

On the other hand, after the Sumatra-Andaman earthquake, December, 26, 2004, $M_w=9$, the author found a very long-range chain of earthquakes with magnitude $M >= 5.5$ that preceded it within 15 months. Chains with same parameters preceded within 15 months all but one earthquakes of $M_w >= 8.3$ in 1976-2004. Since then two more chains with the same parameters, one in Melanesia area, and the other in NW of Pacific (from Taiwan to Kuriles). At the E2C2 session of the EGU meeting in Vienna one year ago both chains were presented as "possible candidates, $M_w 8.3+$ ". The recent earthquake in Kuril islands, $M_w=8.3$, has occurred within the area of the second "candidate", thus confirming that issue. No earthquake of magnitude $M_w >= 8.3$ occurred within the area of the first one, but very large earthquake (Tonga, May 3, 2006, $M_w=8.0$) did occur there.

Here I show the complete set of 25 chains, study their time-space-magnitude properties, and estimate the probability that correlations between large earthquakes and

large chains is not just a coincidence. This may help to understand specific physical mechanisms of long-range correlations in seismicity.