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Multi-parameter observation of pre-earthquake signals and their potential for short –term earthquake forecasting

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We present methodologies for the multi-parameter observations of pre-earthquake phenomena and their retrospective/prospective testing. The hypothesis that the strongest earthquakes depend on the global stress field leads to global observations and a multi-parameter and multi-sensors approach.
In 2012 we performed coordinated tests of several geophysical and environmental parameters, which are associated with the earthquakes preparation processes, namely: 1) Rocks deformation measurements (Kalenda et al. 2012); 2) Subterranean non-stationary electric processes (Bobrovskij 2011); 3) superconducting gravimeters (SGs) records and broadband seismometers (BS) time series (Shen et al); and 4) satellite infra-red observations (10-13 μm) measured at the top of the atmosphere (Ouzounov et al , 2011).
In the retrospective test for the two most recent major events in Asia: Wenchuan earthquake (2008,China) and the latest Tohoku earthquake/tsunami (2011, Japan) our combined analysis showed a coordinated appearance of anomalies in advance (days) that could be explained by a coupling process between the observed physical parameters and the earthquake preparation processes.
In 2012 three internal retrospective alerts were issued in advance (days) associated with the following events: M7.7 Okhotsk sea of August 14; M7.3 Honshu EQ of December 7 and M7.1 Banda sea EQ on December 10. Not all observations were able to detect anomalies before the M 7.4 Guatemala EQ of November 11. We discuss the reliability of each observation, their time lag, ability to localize and estimate the magnitude of the main shock.

References

Bobrovskij V. (2011): Kamchatkian Subterranean Electric Operative Forerunners of Catastrophic Earthquake with M9, occurred close to Honshu Island 2011/03/11 . IUGG Meeting Melbourne, 2011. postrer.
Kalenda P. et al. (2012): Tilts, global tectonics and earthquake prediction. SWB, London, 247pp.
Ozounov D. et al. (2011): Atmosphere-Ionosphere Response to the M9 Tohoku Earthquake Revealed by Joined Satellite and Ground Observations. Preliminary results reported at EGU 2011 in Vienna, Austria. http://arxiv.org/abs/1105.2841.