



Prof. Vladimir I. Keilis-Borok
Distinguished Professor, Institute of Geophysics and
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Most important awards, prizes and academies

Awards: First Richardson medal for non-linear dynamics (1998). *Academies:* American Academy of Arts and Sciences (1969); US National Ac. Sci. (1971); Russian Ac. Sci. (1988); Royal Astronomical Society (1989); Austrian Ac. Sci. (1992); Academia Europaea (1999); President, Int. Union of Geodesy and Geophysics (1987-91); Pontifical Academy of Sciences (1994); Russian Ac. Sci. Committee for International Security and Disarmament (1997-). Expert, technical meetings on the nuclear test ban treaty (1960-62, 1987-90); Chairman of several international projects for basic research; member of the editorial boards of several international journals.

Summary of scientific research

He studied the dynamics and structure of solid Earth, with applications to earthquake prediction, the identification of nuclear explosions, and mineral exploration. Later on, his research was extended to the dynamics of chaotic and complex systems, with applications to the prediction of critical phenomena, socio-economic crises included. A distinctive tradition of these studies has been the involvement of world-class 'pure' mathematicians, and direct transition from fundamental research to major applications. In this tradition he founded the International Institute of the Russian

Academy of Sciences; the biannual International Symposia for Mathematical Geophysics; annual workshops at the Abdus Salam International Centre for Theoretical Physics, Trieste; and an international series of publications.

Main publications

Keilis-Borok, V.I. (ed.), *Computational Seismology and Geodynamics*, Series currently published in Russia and USA (1966-present); Keilis-Borok, V.I. and Sánchez Sorondo, M. (eds), *Science for survival and sustainable development*, Scripta Varia 98, Pontifical Academy of Sciences (Vatican City, 2000), pp. 427; Keilis-Borok, V.I., Seismology and logic, *Research in Geophysics*, 2, The MIT, Press, pp. 61-79 (1964); Keilis-Borok, V.I. and Yanovskaya, T.B., Inverse problems of seismology (structural review), *Geophys. J.R. Astr. Soc.*, 13, pp. 223-34 (1967); Keilis-Borok, V.I., Press, F., On seismological applications of pattern recognition, *Source Mechanism and Earthquake Prediction Applications* (Paris, 1980); Gabrielov, A.M. and Keilis-Borok, V.I., Patterns of stress corrosion: geometry of the principal stresses, *PAGEOPH*, 121, n. 3, pp. 477-94 (1983); Lichtman, A.J. and Keilis-Borok, V.I., Aggregate-level analysis and prediction of midterm senatorial elections in the United States, 1974-86, *Proc. Natl. Acad. Sci. USA*, 86, pp. 10176-80 (1989); Keilis-Borok, V.I. (ed.), Intermediate-term earthquake prediction: models, phenomenology, worldwide tests, *Physics of the Earth and Planetary Interiors*, 61, pp. 1-144 (1990); Kantorovich, L.V. and Keilis-Borok, V.I., Earthquake prediction and decision making: social, economic, legislative and civil defence domains, *Proc. of International Conference 'Earthquake Prediction: State-of-the-Art'*, Strasbourg, France, 15-18 October, pp. 586-93 (1991); Gabrielov, A., Keilis-Borok, V. and Jackson, D., Geometric incompatibility in a fault system, *Proc. Natl. Acad. Sci. USA*, 93, pp. 3838-42 (1996); Keilis-Borok, V.I. and Shebalin, P.N. (eds), Dynamics of the lithosphere and earthquake prediction, *Physics of the Earth and Planetary Interiors*, 111, pp. 179-327 (1999); Gabrielov, A., Keilis-Borok, V., et al., Critical transitions in colliding cascades, *Physical Review E*, 62, pp. 237-49 (2000); Keilis-Borok, V., et al., Pre-recession pattern of six economic indicators in the USA, *Journal of Forecasting*, 19, pp. 65-80 (2000); Keilis-Borok, V., Earthquake prediction: state-of-the-art and emerging possibilities, *Annu. Rev. Earth Planet. Sci.*, 30, p. 38 (2002); Keilis-Borok, V.I., and Soloviev, A.A. (eds), *Nonlinear Dynamics of the Lithosphere and Earthquake Prediction*, Springer-Verlag, (Heidelberg, 2003), p. 337; Keilis-Borok, V.I., et al., On predictability of homicide surges in megacities, in Beer, T. and Ismail-Zadeh, A. (eds), *Risk Science and Sustainability*, Kluwer Academic Publishers, Dordrecht, pp. 91-110 (2003); Keilis-Borok, V.I., et al., Dynamics of macroeconomic indicators before the rise of unemployment in Western Europe and the USA, submitted to *European Economic Review* (2003); Zaliapin, I., Keilis-Borok, V. and Ghil, M., A Boolean delay equation model of colliding cascades. Part II: Prediction of critical transitions, *Journal of Statistical Physics*, 111, pp. 839-61 (2003); Keilis-Borok, V., et al., Reverse tracing of short-term earthquake precursors, *Physics of the Earth and Planetary Interiors*, 145, pp. 75-85 (2004); Shebalin, P., Keilis-Borok, V., et al., Advance short-term prediction of the large Tokachi-oki earthquake, September 25, 2003, M=8.1 A case history, *Earth Planets Space*, 56, pp. 715-24 (2004).

