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Press release

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Research results
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New method provides better earthquake warnings

A new method of stress analysis in earthquake research has been developed by FOI, the Swedish Defense Research Agency. The method is a breakthrough for better earthquake warnings. The new method of analysis makes it possible to estimate the complete stress tensor and monitor changes in the magnitude of stress and the instability of faults, which roots the analysis in physics in a manner that earthquake methods normally lack. This makes the method more generally valid, thus facilitating efforts to provide warnings.

Another advantage of the new method is that it makes use of micro-tremor data, that is, data for quakes with a magnitude of between -1 and 5, which offer the greatest possible amount of information for the analysis. Tests with Icelandic micro-tremors from 1990 to 2005 yielded excellent results, with the major earthquakes occurring precisely when they were predicted by the stress analysis. This experience from Iceland therefore indicates that the sites of coming earthquakes can be determined years before they occur.

"What is crucial to whether the analysis is reliable is to what extent the small quakes are analyzed," says the scientist behind the method, Ragnar Slunga.

"Especially if the method is to be used to warn people immediately before a coming earthquake, a few days or a few hours before the quake, it's necessary to analyze very minor micro-tremors as well," Slunga continues.

The Icelandic seismological network where the metering took place started as a Nordic collaborative project in 1988 and has continued as the largest EU project devoted to earthquake warnings. In 2006 the network comprised some 45 metering stations covering most of Iceland. The number of micro-tremors analyzed was about 250,000.

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