New Method for Earthquakes Prediction

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Scientists at Stockholm University in Sweden may have developed a new method for predicting earthquakes with the help of geochemistry. The method involves metering the content of certain metals in underground water, which changes before and after an earthquake.

The team of researchers behind these discoveries, presented in the latest issue of the scientific journal Geology, is led by Alasdair Skelton, professor of petrology and geochemistry at Stockholm University. An other member of the research group is Lillemor Claesson at the same department.

Earthquakes primarily represent a threat to areas where continental plates meet: Japan, Turkey, California, for example. A major problem is the difficulty of quickly predicting quakes and the risks in these prone areas. Now Alasdair Skelton and his research team are claiming that it may be possible to predict tremors by metering how the content of metals in underground water changes.

The method was developed in Iceland, before and after a major earthquake (5.8 on the Richter scale). The chemistry of Ice Age water was sampled from a 1.5 km deep well in northern Iceland and was monitored for 10 weeks before and one year after the earthquake, which occurred on September 16, 2002.

Chemical peaks for iron and chromium, manganese, zinc and copper were detected 10, 5, 2, and 1 week(s) before the earthquake. After the tremor they returned to their normal levels. Comparison with

experimental studies indicates that these chemicals were dissolved from the surrounding rock, but at higher temperature and therefore deeper in the Earth's crust. Upward migration of this chemically-fingerprinted water to the team's sampling station could result from changes in the permeability of the Earth's crust, caused by the accumulation of energy before the earthquake.

Alasdair Skelton feels that it is now time to test whether these observations from Iceland agree with observations and metering in other earthquake-prone areas.

"Water chemistry may thus provide us with a tool which may help us to predict earthquakes. Shortly after the earthquake, we detected a rapid chemical shift for a range of elements and isotopes. We interpret these changes as indicative of the rapidity with which the permeability of the fault zone changes during an earthquake cycle, with one reservoir being sealed off, while another is unsealed," says Alasdair Skelton.

Source: Stockholm University