Published online: 15 August 2007; | doi:10.1038/news070813-6

Talc softens earthquake chafing

Mineral shown to ease part of California's quake zone.

Rex Dalton

Talc, the balm that stops chafing for babies' bottoms, seems also to soften the rubbing along some faults within the Earth.

Researchers drilling deep into the San Andreas fault in California report in today's *Nature*[1] the presence of talc inside a relatively sedate section of the famous fault. This seems to explain why this region of the fault typically creeps slowly to relieve stress, rather than experiencing the abrupt slips that cause large earthquakes.

"It looks like the talc prevents the fault from shooting off to cause big quakes," says Christopher Wibberley, a geologist at the University of Nice in France, who has written a companion analysis about the work for *Nature*[2].

Talc is the softest known natural material. In this case, it is created by minerals and water reacting under the high pressure created by Earth's slabs grinding together 3,000 metres deep within the fault, which runs the length of much of California.

"I wasn't specifically looking for talc, so it was neat to find this result," says Diane Moore, a petrologist at the US Geological Survey in Menlo Park and lead author on the study.

At least one area of the San Andreas fault that 'creeps' rather than quaking is softened by some talc.

Punchstock

Soft touch

The discovery was made after examining samples from near the bottom of a 3,000-metre shaft drilled into the fault line at Parkfield in 2005. This was done as part of a groundbreaking study to place monitoring devices deep into an active fault zone — a project known as the San Andreas Fault Observatory at Depth (SAFOD).

At Parkfield, which lies in a valley some 200 kilometres south of the San Francisco Bay, the fault creeps at a rate of as much as 28 millimetres a year. North and south of this sedate section, the fault is known for 'stick and slip' action, which leads to large earthquakes with little fault movement in intervening years.

Moore, who studies rock deformations, was looking for a mineral called serpentine in the drill cuttings — a relatively soft mineral found at Parkfield's surface that has previously been posited as the cause for slow creep in this part of the fault zone. Some think that this mineral is still too hard to really explain what's controlling the fault, but it was worth looking for.

Moore found serpentine. But she also discovered talc — a mineral that's chemically related to serpentine and often found alongside it — which is even softer. This far better explains the slow creep underground.

"This goes a long way toward explaining what is happening at that depth there," says Wibberley, adding that it doesn't explain activity along the other sections of the San Andreas fault.

The SAFOD team this June began to drill at an angle out of their primary shaft into other areas of the fault zone known to be more seismically active. Moore and her colleagues are keen to see how the presence of talc may differ in these parts of the fault.

Visit our newsblog to read and post comments about this story.

Top

References

1. Moore, D., *et al*. *Nature* **448**, 795-797 (2007). | Article |
2. Wibberley, C. *Nature* **448**, 756-757 (2007). | Article |

Top