



Heating up the Alpine Fault!

A VICTORIA SCIENCE TEACHING RESOURCE

WHO ?

The Deep Fault Drilling Project, led by a group of scientists from Victoria University, GNS Science, and the University of Otago.

WHAT DID THEY DISCOVER ?

Unexpectedly hot water.

WHERE ?

Westland, north of Franz Josef Glacier

HOW DID THEY DISCOVER IT ?

They drilled a 900 m deep borehole into the Alpine Fault to find out what happens during an earthquake. When they got down 630 metres they found water that was hot enough to boil at the surface (100 degrees Celsius). It doesn't bubble and boil deep underground because of the high pressure.

READ THE ARTICLE

► www.victoria.ac.nz/news/2017/05/scientists-discover-extreme-geothermal-activity-in-south-island

WHY IS THIS INTERESTING ?

Normally we wouldn't find hot water this close to the surface without seeing volcanic activity nearby (like we do in the Taupo region). Drilling projects in other parts of the world and New Zealand, even nearby, had to drill to depths of more than 3 kilometres to find water this hot.

WHY MIGHT THIS BE HAPPENING ?

At the Alpine Fault, one tectonic plate is being pushed sideways and upwards. Every now and then the plates shift suddenly, which is how earthquakes happen. During each earthquake, hot rocks from deep in the earth get pushed upwards a little bit more. This process has been going on for a long time (millions of years) and rocks beneath the mountains still contain quite a bit of heat from deep in the earth. Earthquake shaking has shattered the rocks and rain water can flow into the mountains where it is warmed up by the hot rock.





Activities for your Class

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QUESTIONS FOR YOUR CLASS

- The scientists think that this discovery might be very useful to the people living in Westland. Why do you think that might be?
- How could people use this discovery?
- What other data should scientists gather to help us understand and use this new discovery?
- Why might they have drilled into the fault line in the first place?
- Have there been other discoveries made throughout history that were made by accident?

ACTIVITY: GROUND WATER

When water reaches the ground through rain or snowmelt, not all of it flows off down into rivers and streams. Some of it will start to flow into the ground through gaps and cracks in the surface. Eventually the water reaches an area that it can't flow through and begins to collect. We call these underground areas of water 'aquifers'. Sometimes, these aquifers get heated up by hot rocks moving up from the centre of the earth, which is what the Deep Fault Drilling Project discovered. Your class can test out how ground water flows through different materials.

INSTRUCTIONS

1. Take six equally sized plastic bottles and put four equally sized holes in their bottoms.
2. Fill five to halfway with a different material: Soil, sand, wet clay, gravel, dried clay (put it in wet and let it dry). Leave one empty.
3. Pour a cup of water into each one and time how long it takes for water to stop emptying out of the bottom.
4. Repeat. Does it change when the material in the bottle is wet?

QUESTIONS TO ASK

- How can we make sure that the information we're collecting is accurate?
- What are some other tests we can do?
- In what real-world situations might this information be important to know?

Find out more about the Alpine Fault at GNS Science:

▶ www.gns.cri.nz/Home/Learning/Science-Topics/Earthquakes/Major-Faults-in-New-Zeland/Alpine-Fault