

# WHAT'S ON OUR PLATES?

EXPLORE OUR ACTIVE PLATE BOUNDARY

MODULE

4

Discovering the Alpine Fault

## WHERE IS THE ALPINE FAULT

The Alpine Fault is one of the longest natural straight lines in the world. How long is its straightest section?

\_\_\_\_\_ kilometres

The straight part of the Alpine Fault runs from:

\_\_\_\_\_ in the North,

to \_\_\_\_\_ o' \_\_\_\_\_

in the South.

Which major road takes you over the Alpine Fault near Lewis Pass?

\_\_\_\_\_

Near which campsite will you find an 80ft wall, erected in the year \_\_\_\_\_ to monitor fault movement? \_\_\_\_\_

## HOW DID WE FIND IT?

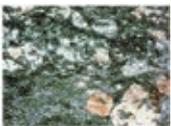
What is the name of the famous geologist and surveyor who discovered the Alpine Fault?

\_\_\_\_\_

He discovered three types of rock (below) which are found along the Alpine Fault boundary;

**Match the rocks to their description:**

(Hint: review the section 'How did we find it' if you are unsure)



**Schist:**

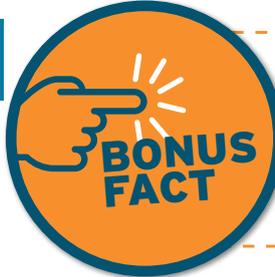
A medium grade metamorphic rock, with flat sheet-like grains, derived from clay/mud.

**Granite:**

A coarse-grained igneous rock, composed mostly of quartz. Common in continental crust.

**Cataclasite:**

A granular fault rock, formed through fracturing in the upper crust.



The John o'Groats River was named after the 'Milford Sound Hermit' Donald Sutherland, a Scottish man who travelled from Europe to explore and never left, accompanied by his little dog - John o'Groats!

Below is an example of a \_\_\_\_\_.

These layers form when earthquakes cause material from one side of the fault \_\_\_\_\_ to fall across onto the other side, creating a distinctive wedge shape.



BONUS POINTS

Can you draw where you think the wedge is?

What is the name given to the testing method that scientists use to work out how long ago an earthquake happened?

\_\_\_\_\_

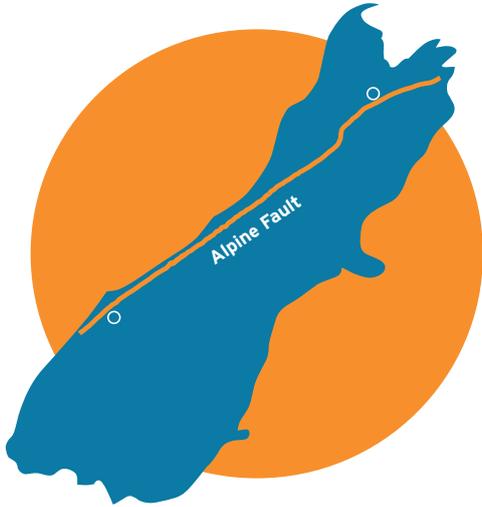
What do scientists look for in sediment layers when they want to test for dates and times of earthquakes?

\_\_\_\_\_

\_\_\_\_\_

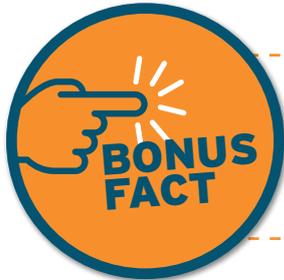
## SOME VERY SPECIAL HILLS

What is the name given to the special hills located at the northern and southern ends of the Alpine Fault?



How far have the hills travelled apart over time / multiple earthquakes? \_\_\_\_\_ km

Remember in Module 2 when we talked about types of plate movement? The hills were once joined together and have separated over millions of years as the Australian and Pacific plates have transformed - where they slowly grind sideways past each other.



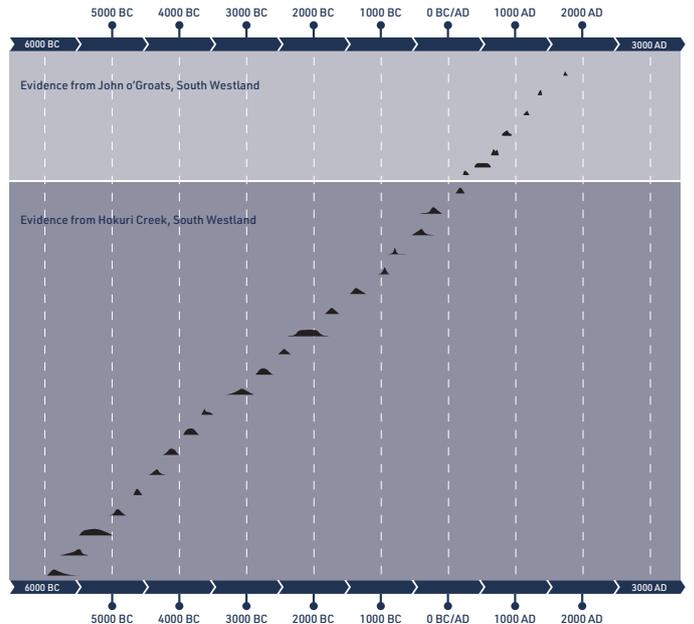
The scientists at Gaunt Creek in 2014 started work drilling into the Basement Rock, which is the same rock found in the hills all around Fiordland.

**DID YOU KNOW?** Did you know: the Kaikōura 7.8 magnitude earthquake lifted the seabed by up to 2 metres in places along a 20 kilometre stretch of the Kaikōura Coast, and in one place lifted the land by 5.5 metres!

The next Alpine Fault earthquake is inevitable. Complete this sentence:

We can't \_\_\_\_\_ earthquakes, but we can \_\_\_\_\_ for them.

## ALPINE FAULT EARTHQUAKES



What is the name given to the period of time between earthquakes?

What is the average time period between earthquakes on the Alpine Fault? (circle one)

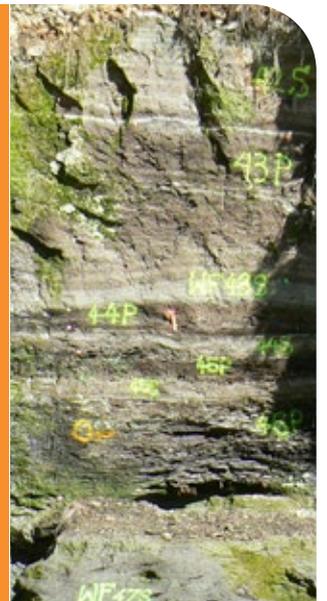
- 90 140 170 200 290 500

Roughly how long ago was the last 'Great Earthquake' on the Alpine Fault (circle one)

- 90 140 170 200 290 300

In the last 'Great Earthquake' on the Alpine Fault, the Southern \_\_\_\_\_ moved southwards by \_\_\_\_\_ metres, and upwards by \_\_\_\_\_ metre.

At Hokuri Creek an outcrop shows different layers from earthquake events: the brown deposits/layers represent the \_\_\_\_\_ prior to the earthquake, and the lighter coloured deposits are \_\_\_\_\_ left after the earthquake.



**Juicy  
Jargon**

**DOWN:**

1. An earthquake over magnitude 8 is described as what? (5,10)
2. What is the study of rock layers (strata) and layering (stratification) called? (12)
3. Geologists use a polycrystalline diamond bit to undertake what? (8)

**ACROSS:**

4. What is the name/term given to the ancient/oldest metamorphic and igneous rock that forms the crust of continents (8,4)
5. What scientific unit of measurement is used by geologists looking at cuttings from drilling? (6)

In Rob's video, he refers to a 'scarp' several times - what is a fault scarp?

---

---

---

---

Why do the characteristics of rocks change close to the fault? (Hint: Deep Fault Drilling video)

---

---

---

---

---

---

---

---

Sediment is studied to identify where earthquakes have occurred, and radiocarbon dating tells us exactly when they occurred, but what else do scientists look for to tell them what the environment was like at the time of these earthquakes?




---

---

---

 **Google Search challenge:**  
How is **Cataclasite** formed?

---

---

---

---

---

---