



Geochronology

with Dr Dawn Kellett

Talking points

Knowledge

1. What are isotopes?
2. What are ancient faults?
3. What is mass spectrometry?

Comprehension

4. How do tectonic plates contribute to the formation of geological faults?
5. What challenges do researchers face when dating faults?
6. How do technological advancements aid in improving the accuracy of geological dating methods?

Application

7. Imagine you are a geologist tasked with conducting fieldwork in a region known for containing many fault systems. What kind of questions could you ask about the fault systems? Why might it be important to find out when the fault was first and last active? What might those faults tell you about past plate movements in the region?

Analysis

8. What is the significance of studying fault zones in Canada and beyond for expanding geological knowledge?
9. How do Dawn's research findings contribute to our understanding of Earth's complex history?

Evaluation

10. Discuss the potential societal and environmental implications of Dawn's research findings on fault dating. How could this knowledge inform urban planning, resource management, and disaster preparation strategies?
11. Evaluate the impact of technological advancements, such as tandem mass spectrometers, on the accuracy and precision of geological dating methods. What are the limitations and potential biases associated with these advancements and their implications for interpreting geological data?

Activity

Exploring fault dating methods

As Dawn explains, accurately determining the ages and history of geological faults is crucial for learning about Earth's complex history and predicting future geological events. Fault dating methods serve as invaluable tools in this effort, allowing researchers to investigate Earth's evolution. Consequently, studying these methodologies in-depth to understand their principles and applications is extremely important.

1. **Research** a variety of methods used in geological dating, with a focus on the fault dating techniques highlighted in the article. Explore methods such as radiometric dating, paleomagnetism and stratigraphy. What do each of these methods involve, and how can they be applied to fault dating?
2. **Select** one fault dating method that intrigues you the most and create a brief presentation explaining how it works and its significance in geological research. Include key concepts, diagrams and examples to illustrate the method's principles and applications.
3. **Reflect** on why you chose the particular fault dating method for your presentation. Consider its strengths, limitations and unique contributions to understanding Earth's geological evolution. How does this method complement or enhance our knowledge compared to other fault dating techniques?
4. **Share** your presentation with your classmates, either through a live presentation or a digital platform. Engage in a discussion about the strengths and limitations of each fault dating method presented, considering factors such as accuracy, precision and applicability to different geological contexts or periods of geological history.

More resources

- Visit Dawn's homepage to learn more about her work: profil-profiles.science.gc.ca/en/profile/dr-dawn-kellett
- Read more about the Geological Survey of Canada: natural-resources.canada.ca/research-centres-and-labs/geological-survey-canada/17100
- Learn more about the Canadian Tectonics group: www.canadiantectonicsgroup.ca